PENTACON SIX

Contents:

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Notes About This CD:

1. Page numbering has been changed from the original manual to eliminate the blank pages.
2. Not all of the part numbers are legible in the exploded drawings—even in our original materials from the manufacturer. However, parts are no longer available.

1. General Notes regarding the Repair Manual

1.1. This Repair Manual is based on the production stage of September 20th, 1966.

1.2. We assume knowledge of our Instructions for Operation.

1.3. The designations "left," "right," "bottom," "front" etc. used in this Manual refer to the camera in the following position.
The camera stands on its base the camera back (film track) facing the repair mechanic.

1.4. When using circlips according to German Standard 0-6799 make sure that the smooth side comes into contact with the functioning point.

1.5. For lubrication use pure watchmaker's oil only, (the oil is resistant to temperatures between – 15° and + 40 °C), lubricate slide faces with "Fett 207" (Ceritol M 28 T 4).

1.6. Parts or groups which, before assembly, have been cleaned in benzine, trichlorethylene, or in any other cleaning agent should by all means immediately be aftertreated with a 20:1 benzene-oil-mixture (consisting of 20 parts of cleaning benzene and 1 part of oil).

1.7. If screws have been secured with lacquer, before assembly, the lacquer must be dissolved by a nitro diluting agent or butyl acetate. After remounting, all screws and functioning points previously fastened by lacquer, again have to be fastened by lacquer.

1.8. In dismantling, put aside all parts in that order in which they have been removed, particularly, shims and washers, which in reassembling must be remounted in the same order.

1.9. If not otherwise mentioned, all parts and groups belong to the main number 139.008. When ordering spare parts, please specify also the main numbers preceeding the group or part numbers.

1.10. All part or group numbers underlined in the exploded view, mean spare parts or parts subject to wear.

2. Instructions for Dismantling the Pentacon six 139.008

The exploded view gives a survey of the component parts and groups, resp. It is intended to be used for dismantling.

This manual describes the dismantling process of the camera in the most appropriate order.

Dismantling the Gear Support 20.00 from the camera body 85.00

2.1. **Dismantling the complete camera top 5.00**

2.1.1. Dismantling the bayonet ring 190.000–0.10, front panel –0.03
2.1.2. Dismantling the film reminder dial –0.04, reminder dial 158.009–0.01 (pasted)
2.1.3. Dismantling the speed setting dial –5.01, compl. winding lever –1.00
2.1.4. Dismantling the complete camera top –5.00 with complete counting device –3.00
2.1.5. Dismantling the counting dial –15.00, riveted group

2.2. Dismantling the image field lens –207.250

2.3. Dismantling the complete inset piece 190.000–5.00

2.4. **Dismantling the complete gear support 20.00 from the complete camera body –85.00**

2.4.1. Dismantling the complete cable 190.000–150.00
2.4.2. Dismantling the complete measuring cylinder –18.00

2.5. **Dismantling the camera body –85.00**

2.5.1. Dismantling the base plate –11.00 (remove the cover previously)
2.5.2. Dismantling the complete spool support –12.00
2.5.3. Dismantling the complete camera back –100.00 together with the hinged plate –90.00, riveted group
2.5.4. Dismantling the protecting sheet –0.14
2.5.5. Dismantling the complete release knob 190.000–6.00

2.6. **Dismantling the complete gear support 20.00**

2.6.1. Dismantling the mirror 190.000–0.26
2.6.2. Dismantling the complete speed lever 190.000–35.00 as well as the lever system 190.000–20.29
2.6.3. Dismantling the complete plate –22.00
2.6.4. Dismantling the complete slow speed mechanism 190.000–40.00 als well as the complete curtain groups 190.000–65.00 and 190.000–75.00
2.6.5. Dismantling the complete shutter mechanism –40.00 as well as the complete lever –24.00 together with the light protection plate 190.000–20.35
2.6.6. Dismantling the slide plate 190.000–20.17 together with light protection plate 190.000–20.09
2.6.7. Dismantling the complete cover plate 190.000–20.07, together with lever 190.000–120.000 as well as the complete plate (mirror winding mechanism) 190.000–125.000
2.6.8. Dismantling the complete delayed-action mechanism 190.000–21.00
2.6.9. Dismantling the complete mirror base 190.000–141.00 as well as the light protection frame 190.000–20.24

2.7. **Dismantling the complete slow-speed mechanism 190.000-40.00**

2.7.1. Dismantling the speed curve 190.000–41.00, riveted group
2.7.2. Dismantling the B-lever 190.000–40.09 and the complete short-time lever 190.000–43.00
2.7.3. Dismantling the complete flat-coil spring 190.000–42.00
2.7.4. Dismantling the upper plate 190.000–52.00, riveted group
2.7.5. Dismantling the shutter-speed setting-lever 190.000–46.00

2.8. **Dismantling the complete shutter mechanism –40.00**

2.8.1. Dismantling the stop –40.10 and the lever –52.00, riveted group
2.8.2. Dismantling the levers –42.00, riveted group, –54.00, riveted group, and the lever –40.09
2.8.3. Dismantling the complete clutch –60.00
Attention! Don't lift key –60.01 from clutch –62.00, riveted group as otherwise clutch rollers and springs will drop out
2.8.4. Dismantling the complete film-feed wheel –56.00
2.8.5. Dismantling the complete film-feed wheel –45.00 (knock out notched pin, remove film-feed mechanism group)
2.8.6. Dismantling the spur wheels –40.11 and –40.12
2.8.7. Dismantling the spur wheel –40.14 with spring –40.01 as well as spring –40.04
2.8.8. Dismantling the spur wheel –40.14
Attention! To facilitate reassembling, we recommend to mark the mesh at the lower side of the spur wheels –40.14 and –40.15
2.8.9. Dismantling the V_1 spur wheel –190.000–92.00 as well as the V_2 spur wheel –190.000–93.00

3. Instructions for Reassembling the Pentacon six 139.008

3.1. **Reassembling the complete shutter mechanism –40.00**

3.1.1. Reassembling the spur wheels 190.000–92.00; 190.000–93.00 and shaft 190.000–90.01
3.1.2. Reassembling the spur wheels –40.14; –40.12; –40.11; –40.13 as well as the film-feed wheel –45.00
3.1.3. Reassembling the film-feed wheel –56.00; spring 40.04; the lever 54.00 with lever –40.09 as well as the levers –52.00 and –42.00
3.1.4. Reassembling the clutch –60.00

3.2. **Reassembling the complete slow-speed mechanism 190.000–40.00**

3.2.1. Reassembling the shutter-speed setting lever 190.000–46.00
3.2.2. Reassembling the intermediate gears
3.2.3. Reassembling the flat coil spring 190.000–42.00
3.2.4. Reassembling the short-time lever 190.000–43.00, B-lever 190.000–40.09 as well as the speed curve 190.000–41.00

3.3. **Reassembling the complete gear support –20.00**

3.3.1. Reassembling the mirror base 190.000–141.00
3.3.2. Reassembling the plate (mirror winding mechanism) 190.000–125.000 and the complete shutter mechanism –40.00
3.3.3. Adjustment of the mirror base
3.3.4. Reassembling the release lever –20.40
3.3.5. Reassembling the light protection plate 190.000–20.09, slide plate 190.000–20.17, and cover plate 190.000–20.18
3.3.6. Reassembling the lever 190.000–120.00 and the cover plate 190.000–20.07
3.3.7. Reassembling the slow-speed mechanism with curtain groups
3.3.8. Reassembling the speed lever 190.000–35.00 and the B-lever system 190.000–20.29
3.3.9. Reassembling the delayed-action mechanism 190.000–21.00, the cable 190.000–150.00 as well as the light protection frame 190.000–20.24

3.4. **Final Assembly**

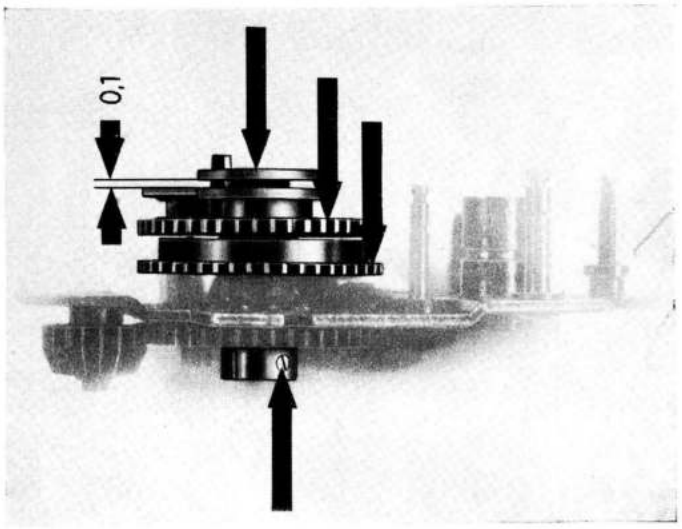
3.4.1. Assembling gear support –20.00 and measuring cylinder –18.00 in the camera body –85.00
3.4.2. Assembling the release knob 190.000–6.00
3.4.3. Adjusting the stroke of the diaphragm plunger
3.4.4. Assembling the camera body inset 190.000–5.00 and checking the focussing device
3.4.5. Adjusting the shutter speeds
3.4.6. Assembling the spool support –12.00, base plate –11.00, and the camera back 100.00
3.4.7. Adjusting the film feed
3.4.8. Assembling the counting lever –15.00, and adjusting the counting operation
3.4.9. Assembling the camera top –5.00 with counting device –3.00 and winding lever –1.00
3.4.10. Checking film feed and counting operation
3.4.11. Assembling the front panel –0.03 and the bayonet ring 190.000–0.10
3.4.12. Assembling the mirror 190.000–0.26, optical adjustment of the camera, and assembling the image field lens
3.4.13. Measurement and evaluation of shutter speeds

3.1. Reassembling the complete shutter mechanism –40.00

3.1.1. Reassembling the spur wheels 190.000 –92.00, 190.000–93.00; the spur wheel 40.14 and shaft 190.000–90.01

Place spur wheel 190.000–93.00 on to bearing bush and push the lug into the brake springs. Put spur wheel 190.000–92.00 on to bearing bush so that the control lever will rest against buffer 190.000–100.10. Insert shaft 190.000 –90.01 into borehole of bush, place spur wheel –40.15 on to shaft, and adjust it so that cylindrical grooved pin 1 × 2.5 DIN 0–1473 can be fixed into the borehole.

Countersink threaded pin M 1.7 × 2 DIN 0–553 to shaft. Screw in threaded pin M 1.7 × 2 DIN 0–551. Apply lacquer to screws! The shaft must have 0.1 mm vertical play.



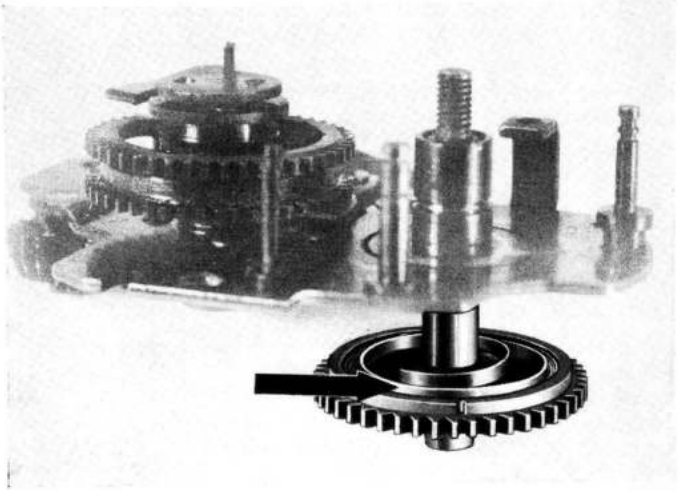
3.1.2. Reassembling the spur wheels –40.14, –40.12, –40.11, 40.13 and the film-feed wheel –45.00

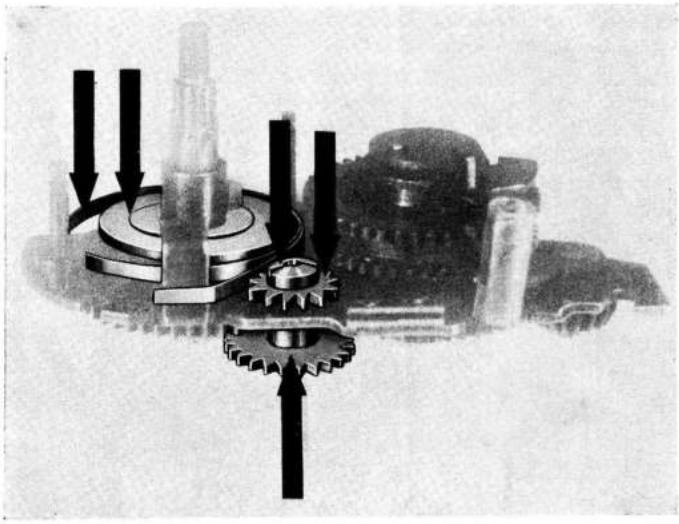
Turn down outer end of spring 190.000–90.05 in slit of spur wheel –40.14, coil up the spring towards the center. Push spur wheel into borehole of the bush and hook inner end of the spring in the slit of bush. Tension winding shaft so (spur wheel –40.15 in its end position) that markings are in coincidence.

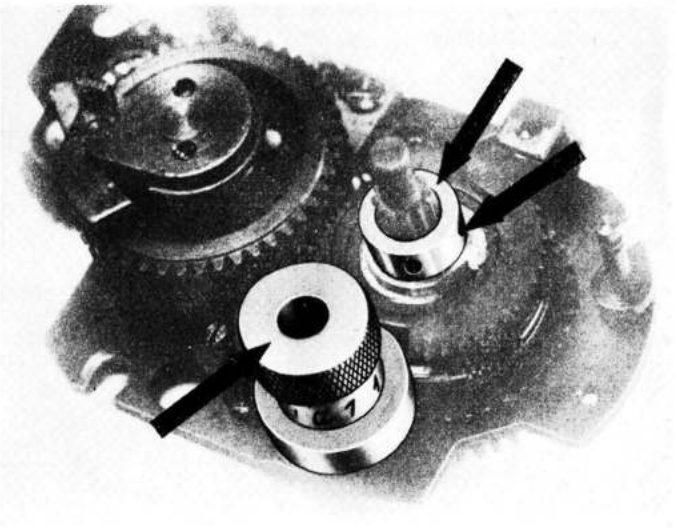
Push spur wheel –40.12 into the front bush, attach spur wheel –40.11 from above, screw on slit nut, fasten by lacquer.

Wind spring –40.01 onto spur wheel –40.13, push the latter onto bush, hook spring into angle plate, fasten spur wheel by circlip 5 × 0.63 German Standard 0–9045.

Wind spring –40.01 onto spur wheel –40.13 as far as coil diameter is somewhat less than disk diameter of 15 mm. Hold spring in this position and push on film-feed wheel –45.00, then push adjusting bush 139.008–40.00 B 2/1 on the 2 mm shaft, and approach film-feed wheel to adjusting bush. Now tension winding shaft and press in grooved pin 190.000–90.08. The winding shaft should have an end clearance of 0.2 – 0.3 mm, and the upper wheel disk of the film-feed wheel should be adjacent to the adjusting bush (in its tensioned condition).







3.1.3. **Reassembling the film-feed wheel –56.00, the spring –40.04, the lever –54.00 with levers 40.09, –52.00, and –42.00**

Push the film-feed wheel –56.00 on excentric shaft and fasten it by circlip 1.2 German Standard 0–6799.

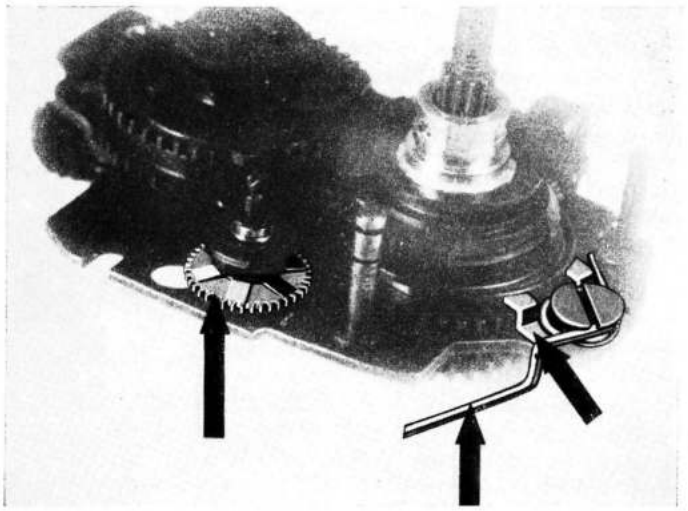
Fasten spring –40.04 and holding angle –40.16 by screw –40.20. The holding angle should be adjacent to centre of spring.

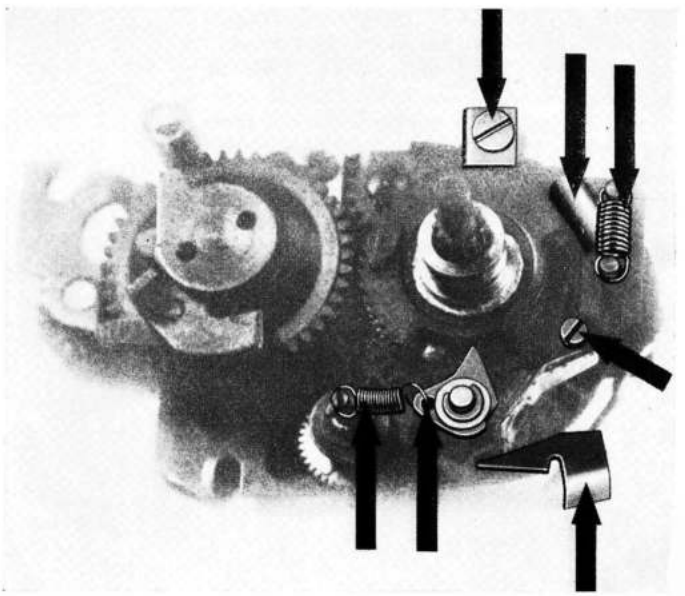
Push lever –40.09 and lever –54.00 on shaft, fasten them by circlip 1.2 German Standard 0–6799. Downward angle of lever –40.09 has to be placed above spring –40.04.

Push on lever –52.00, fasten it by circlip 1.2 German Standard 0–6799, and hook in tension spring –0.22 × 2.4 × 10 f German Standard 18396, push on lever –42.00 (with tension spring –0.18 × 2 × 16 B German Standard 18396), adjust it with washer 2 × 4 × 0.2, fasten it by circlip 1.2 German Standard 0–6799, hook in tension spring.

Lever –42.00 must engage satisfactorily the upper wheel disk of the film-feed wheel –45.00; in its stretched condition it must pass the wheel disk in a 0.2 mm distance.

Fasten tightly stop –40.10 by screw 190.000 –20.10. The stop has to be positioned in the nontoothed section of 151° of the spur wheel –48.00. In this section, the spur wheel –48.00 should be turnable unobjectionably and drawn towards the stop by spring –45.02 (in reassembled condition).





3.1.4. **Reassembling the clutch –60.00**

Push clutch –60.00 on spur wheel –40.14; fasten it with screw –40.19 and lacquer.

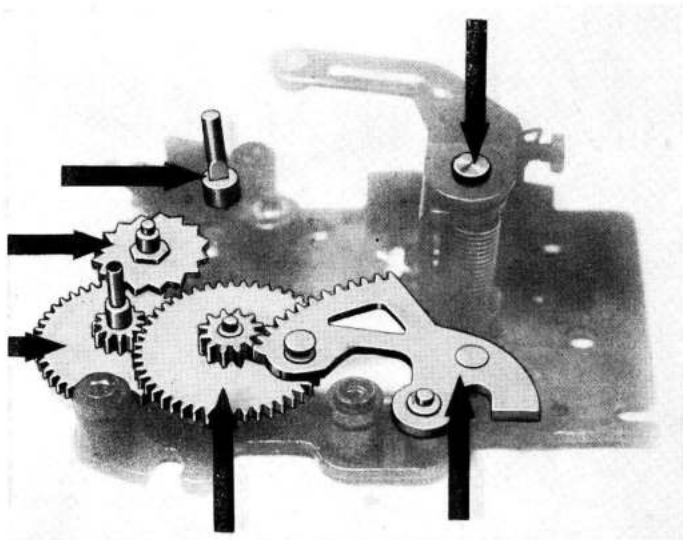
3.2. Reassembling the complete slow-speed mechanism 190.000–40.00

3.2.1. Reassembling the shutter-speed setting lever 190.000–46.00

Slip shutter-speed setting lever 190.000–46.00 with torsion spring 190.000–40.03 on to shaft, add washers and secure assembly with circlip 1.5 German Standard 0–6799.

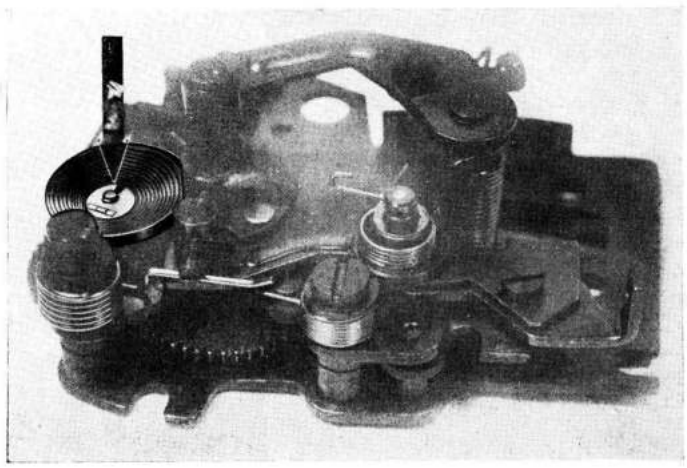
3.2.2. Reassembling the intermediate gears

Install intermediate gears, segment, anchor wheel and anchor assembly into bedplate 190.000–51.00 (cp. illustration), put on plate 190.000–52.00 for slow speed mechanism and screw it tightly. Adjust anchor assembly 190.000 –49.00 by means of threaded pin to assure perfect functioning of slow-speed mechanism.



3.2.3. Reassembling the flat coil spring 190.000–42.00

Press coil spring 190.000–42.00 on to spindle of intermediate gear 190.000–48.00. Adjoin segment 190.000–47.00 to bed-plate. End of spring must lie centrically in borehole of bearing spindle. Fix end of spring with pin 183.000 –30.04. Give coil spring 120° initial tension. The coil spring must not rise on movement of the segment. If necessary, the spring has to be adjusted. Give segment spring 190.000–40.01 approx. 120° initial tension.

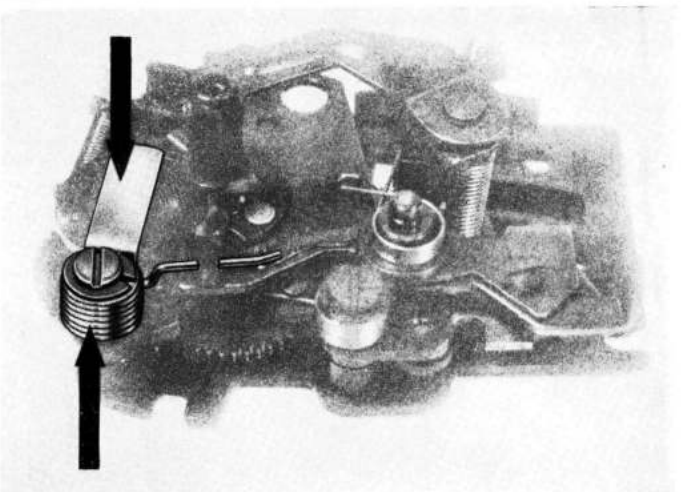


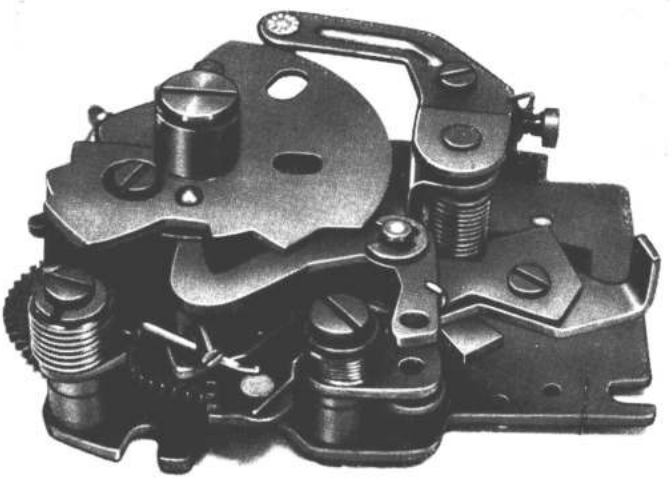
3.2.4. **Reassembling the short-time lever 190.000–43.00, the B-lever 190.000–40.09 as well as the speed curve 190.000–41.00**

Slip short-time lever 190.000–43.00, on to the spindle. Put on torsion spring 190.000–40.02 with bush and fix them with screw 190.000–40.06 so that the long leg of the spring lies between threaded pin and short-time lever.

Place torsion spring 190.000–40.10 on to spindle of short-time lever, put on B-lever 190.000 –40.09, add shims to balance play and secure the assembly with circlip 1.5 German Standard 0–6799.

Swing out the assembled levers. Slip on speed curve 190.000–41.00, add shims 3 × 5 × 0.1 DKS 2001 for vertical adjustment and secure assembly with screw 190.000–40.08. The curve must be movable easily.





3.3. Reassembling the complete gear support –20.00

3.3.1. Reassembling the mirror base 190.000 –141.00

Insert spindle 190.000–140.01 of mirror base on left side of gear support. Fit mirror base into gear support. Press spindle halfway into hinge mounting of mirror base. Place torsion springs 190.000–140.02 and –140.03 on to spindle and give each spring an initial stress by one half a rotation. Push spindle in to end position. Adjust lateral fastening spring 190.000–140.11 with mirror base so that mirror base has 1 mm play in its upward position.

3.3.2. **Reassembling the plate (mirror winding mechanism) 190.000–125.00**

Fix plate 190.000–125.00 on gear side to rear bar of gear support with 2 screws 900 007 004. Carrier for mirror base must stand straight upwards.

Make sure that the plate is pressed downwards and towards the back and 2 screws M 1.7 × 3 German Standard 0–84 are temporarily screwed into the front screw holes.

Tensioning lever 190.000–128.00 of plate 190.000–125.00 must be movable positively and must slide on cast metal partition. Lower end of lever must rest against stop screw 190.000 –140.10. Readjust if necessary.

Paste 1 disk 2 × 4 × 0.3 DKS 2001 to borehole for gear on bar of gear support. Place gear support into assembly tool 139.008–20.00 M 1 and fix it tightly.

Insert glide roller –20.01 into lower bar of gear support. Place gear –40.00 on to assembly tool and fix it to the fastening pins. Observe engagement of the bevel spur gears and position of carrier for mirror base. Use shim 1.6 × 3 × 0.1 DKS 2001 to adjust vertical play of glide roller.

Fasten slightly the plate at its rear edge by screw M 1.7 × 3 German Standard 0–84. Push 1 disk 2 × 5 × 0.2 DKS 2001 onto spindle of release lever –24.00, screw on 1 × nut M 2 German Standard 0–546, insert plate slot of gear support and gear plate, and fasten it slightly with nut spanner A 1398.

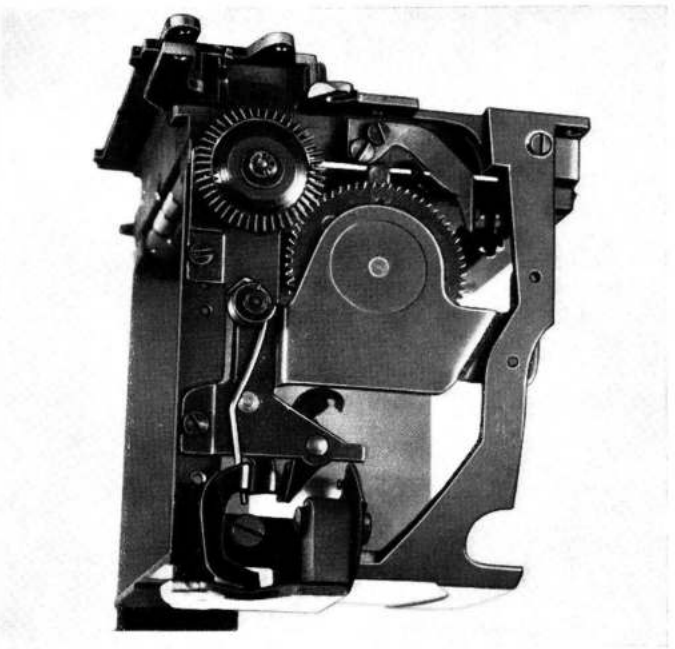
Insert spring end of release lever into opening in gear support. Put on arresting device 139.008–20.00 M 1,2 of assembling tool and lock axle of release lever in borehole.

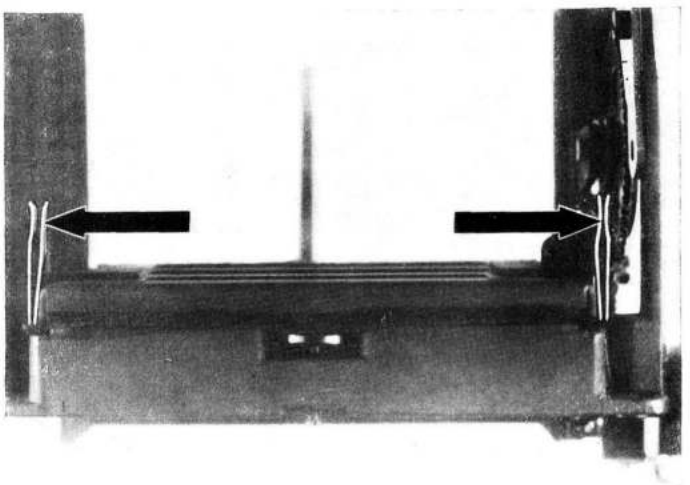
Tighten slotted nut of release lever and screw M 1.7 × 3 German Standard 0–84 tightly. Screw in threaded pin of release lever up to the point where tensioning lever of bedplate glides in contact with the end of release lever. Apply lacquer to screw.

Adjust setscrew on right-hand rear bar of gear support so as to ensure greatest possible depth of engagement of gears between shutter and bedplate on cocking of the gear – to give a clear run-off. Apply lacquer to setscrew.

Cock the shutter, observing that arresting spring 190.000–140.11 of mirror base is satisfactorily released by the carrier lever of plate 190.000 –125.00 before the mirror base swings out of its upper position.

Also, the carrier lever must run back correctly. If necessary, set spring of mirror base has to be readjusted. On cocking of the gear, the mirror base must engage in the safety catch of the bedplate, leaving approx. 1 mm play between mirror base and safety catch. The release lever, on being actuated, has to free the tensioning lever of plate 190.000–125.00 at the same time disengaging the mirror base from its locked position of 46° and moving upwards to engage the brake springs of the mirror base. Depth of engagement of the safety catch may be ad-

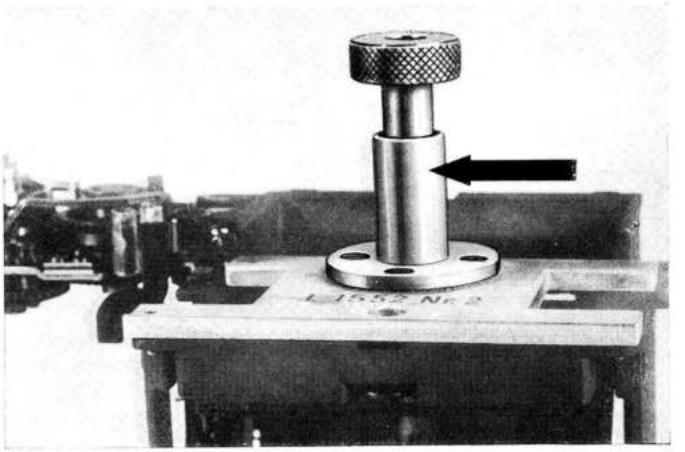




justed by means of shoulder stud 190.000 –103.02. Right and left stop levers of mirror base must engage in brake springs without causing them to be laterally displaced. If necessary, make adjustments.

3.3.3. **Adjustment of the mirror base**

Cock the gear, place adjusting plate L 1552 1 into mirror base. Fix adjusting gauge with pin into the front boreholes of gear support and, by adjusting slotted nut on underside of mirror base with nut spanner, set the correct position of the mirror: 46 ° 30 '. Apply lacquer to slotted nut.

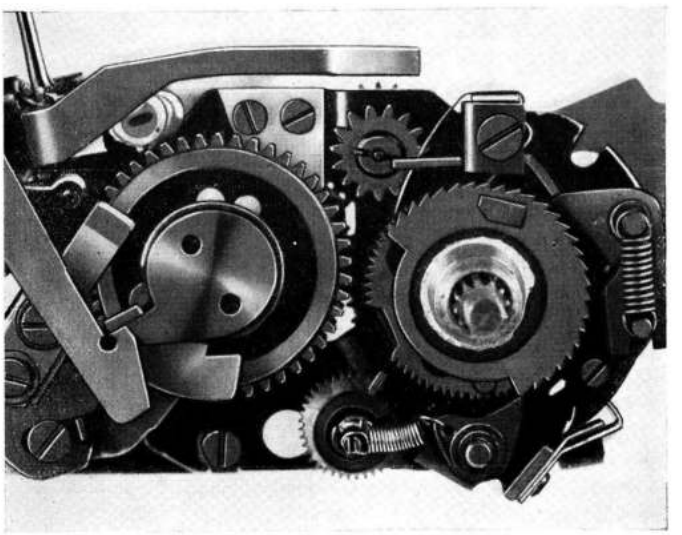


3.3.4. **Reassembling the release lever –20.40**

Screw spindle 190.000–20.12 into gear support with socket wrench, anticipated by insertion of light-protection plate 190.000–20.35. Place release lever –20.40 with torsion spring –20.41 onto spindle and secure it with circlip.

Screw threaded pin M 1.7 × 3 German Standard 0–551 from outside into the lever, secure torsion spring to edge of gear support and place short leg of spring over release lever. Cock the gear.

Move upper shutter wheel to its end position, allow release lever to drop in, and adjust threaded pin to make release lever engage by two thirds with stop lug of upper shutter wheel. Apply lacquer to threaded pin.



3.3.5. **Reassembling the light protection plate 190.000–20.09, slide plate 190.000–20.17, and cover plate 190.000–20.18**

Fix 2 screws M 1.7 × 2 German Standard 0–84 about 1 mm deep on right-hand bar of gear support. Push light protection plate underneath both the screw heads. Take care that rear edge of light protection plate is parallel and at equal height with the edge of the gear support. Tighten the screws.

Screw on cover plate 190.000–20.18 textile-coated surface to inside, and slide plate 190.000–20.17 with 2 screws M 1.7 × 2 German Standard 0–84.

Shutter must be released.

Paste textile-coated side of cover plate 190.000 –20.18 to lower side of mirror base.

3.3.6. **Reassembling the lever 190.000–120.00 and the cover plate 190.000–20.07**

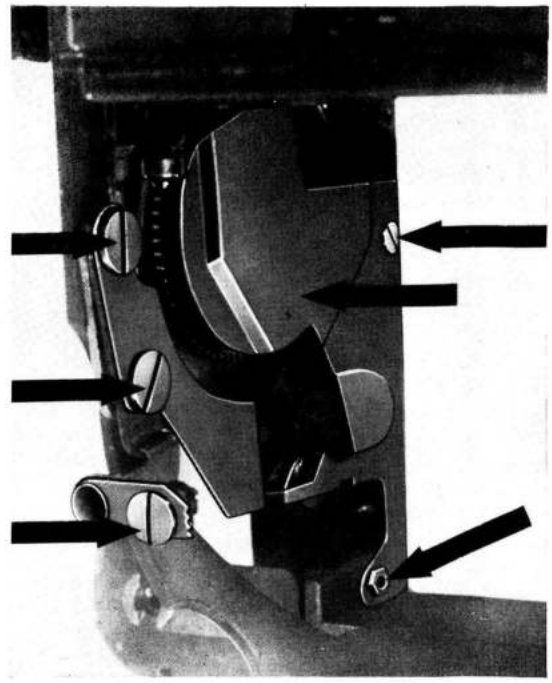
Remove 2 temporarily fixed screws from mirror winding mechanism 190.000–125.00 inside the gear support. Place lever 190.000–120.00 with its guide slot on to rivet of winding lever. Insert cover plate 190.000–20.07 and fix this and automatic diaphragm lever with 2 shoulder screws 190.000–20.06. Fix 1 screw 190.000–20.10 and hexagon nut to inside rear edge of gear support and cover plate with spanner A 1376.

If the diaphragm lever should have excessive side clearance, adjustment must be made by adding washer 3 × 5 × 0.1 DKS 2001 to shoulder screw 190.000–20.06.

On winding and releasing of the gear, the levers must function unobjectionably, the mirror base must not rub on cover plate.

If necessary, readjust cover plate or diaphragm lever.

Use a dial gauge to measure the automatic diaphragm. Resting position (shutter released-resting position, shutter cocked) must attain a stroke of 3.5 ± 0.1 mm. The automatic diaphragm has to be gauged once more with the gear support fixed into the camera body.



3.3.7. **Reassembling the slow-speed mechanism with curtain groups**

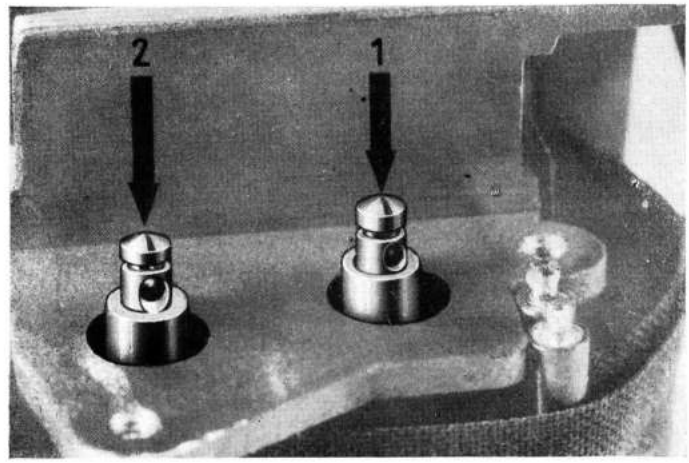
Test run of slow speed mechanism: Press segment of slow speed mechanism inwards; spring tension must cause slow speed mechanism to return to 0-position. Apply grease to both bearing points on axle of flexible spindle of curtain groups 190.000–65.00 and 190.000–75.00 and insert them into the upper boreholes of gear support. 190.000–65.00 = 1st curtain has to go into the rear hole and 190.000–75.00 = 2nd curtain into the front hole. Place 1 little roller 190.000–20.03 on to each of the protruding axles in the boreholes of the gear support.

Place 1 washer 1.6 × 3 × 0.1 DKS 2001 on each of the 2 glide rollers 190.000–20.02 and insert rollers into lower bearings of gear support. Observe that each of the curtain groups must rest on one of the glide rollers.

Attach slow speed mechanism 190.000–40.00 so that axles of flexible spindles and pivots of glide rollers engage in the boreholes in bedplate of slow speed mechanism. Screw slow speed mechanism to gear support with 2 screws M 1.7 × 3 German Standard 0–84. Press 1 cylindrical pin 1 h 11 × 3.5 German Standard 0–7 into boreholes of each of the protruding axles of the flexible spindles. Place 2 stop disks 183.000–15.14 on to the axles so that the stop disks are arrested by riveted-in plate springs on clockwise rotation.

Secure stop disks by adding 2 circlips.

Prestress the flexible spindles by 3 rotations. Place 1 washer 1.6 × 3 × 0.1 DKS 2001 on to pivot of each driving shaft. Pass curtain gears through bedplate of shutter mechanism and insert them into lower bearings. Place plate –22.00 on to bearing pivots of curtain gears



and screw it to gear support with 2 screws M 1.7 × 3 German Standard 0–84.

Adjust plugs of driving shafts with washers 1.6 × 3 × 0.1 DKS 2001. Disengage plate –22.00 with driving shafts from shutter gears. Push upper shutter gear into brake springs of plate. Stop bolt of lower shutter gear must rest against control lever of upper shutter gear. Roll up lower curtain 190.000–65.00 (1st curtain) on shutter side as far as to bring curtain pin within a distance of 1 mm from glide roller on side of slow speed mechansim. Engage gear with upper shutter wheel. Roll up upper curtain 190.000 –75.00 (2nd curtain) as far as to bring curtain pin of 2nd curtain into coincidence with curtain pin of 1st curtain. Engage gear with lower shutter wheel. Tension the shutter as far as to bring the curtain with their pins into the center of the interior of the gear support. Block the shutter. Adjust the curtain groups to the following tension by rotation of the star wheel:

1st curtain	110 cmp
2nd curtain	120 cmp

as measured with vibrating reed in winding direction of the curtain pins. Return curtain groups to initial position.

Aligning slow speed mechanism and gear me-mechanism with gear support.

Place gear support on to assembly tool 139.008 –20.00 M 1, causing the boreholes of slow speed mechanism, shutter mechanism, and gear support to be arrested by the pins in the assembly tool. Bring curtain gears and shutter wheels into correct mesh.

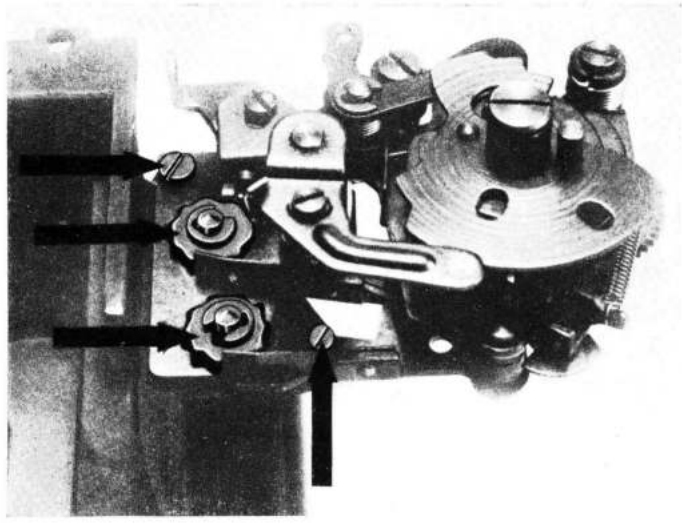
On the pre-adjusted gear support, with the gear tensioned, the width of the slit at the beginning of the picture gate (gear side) must be 1.7 to 2.0 mm, and at the end of the picture gate 2.4 to 2.7 mm. Otherwise, the width of the slit has to be adjusted by movement of gear 190.000–65.01 on the 1st curtain (loosen the 2 threaded pins on the driving shaft).

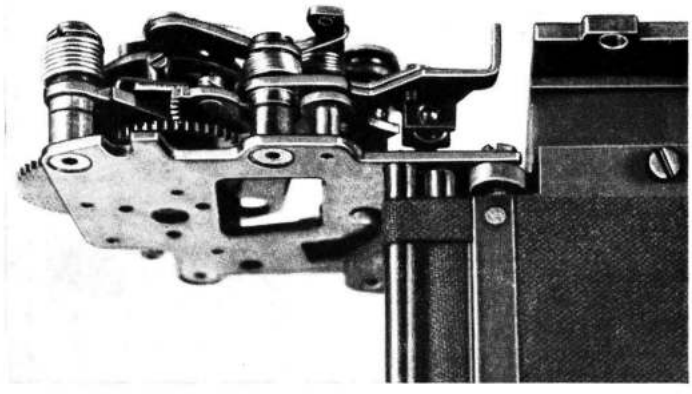
If the values stated above are not obtained by this adjustment, adhesive paper (not exceeding 0.1 mm) should be pasted to the winding points of the ribbons on the 1st curtain. The curtains must run down at right angles to the base, and the curtain pins must run parallel.

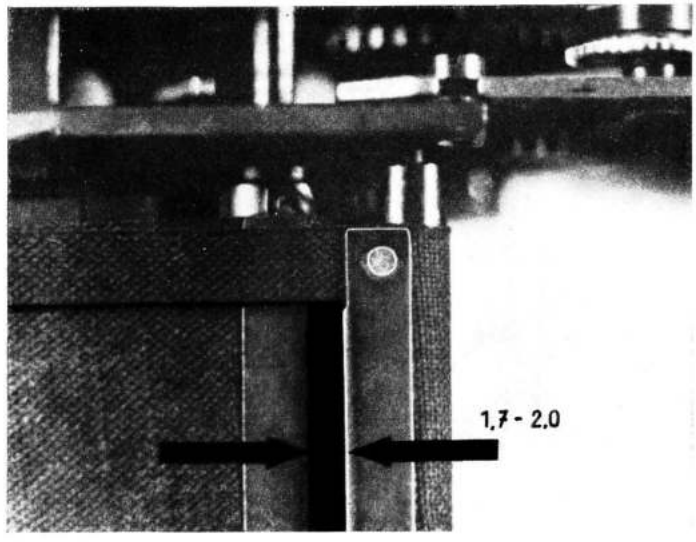
Gear support with pre-adjusted $^1/_{1000}$ sec. has to be checked on period meter (MT 2). Loosen 1 threaded pin, screw in drill jig bush A 1691 and bore 2.8 mm into outer diameter of driving shaft with drill 1.0 mm diam. on 1 diam. D 10. Remove drill jig bush, screw in 1 threaded pin 190.000–20.20, and fasten it with lacquer.

Fix 2nd threaded pin as described above.

Check gear support once more on period meter for $^1/_{1000}$ sec. Correct deviations, if any, by pasting in adhesive paper. The exposure values of beginning – center – and end of picture gate must be between 0.75 and 1.2 ms.





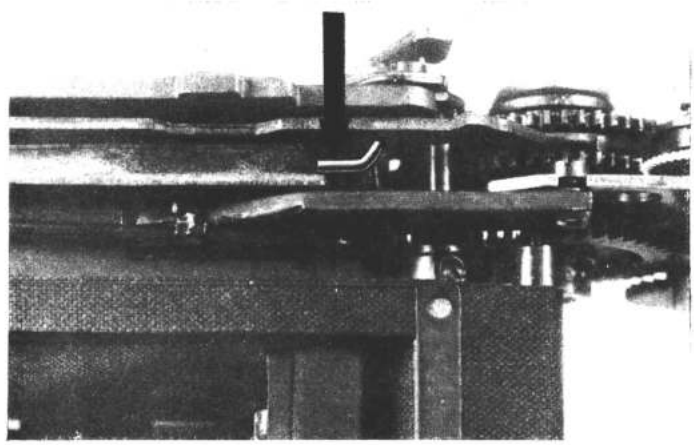


3.3.8. **Reassembling the speed lever 190.000 –35.00 and B-lever system 190.000–20.29**

Insert spindle of speed lever 190.000–35.00 into slot at rear edge of gear support. Place on 1 washer 2 × 5 × 0.2 DKS 2001 and screw it slightly with 1 slotted nut 190.000–20.11 (shutter must be released).

Adjust speed curve to $^1/_{1000}$ sec. Screw speed lever tightly, allowing for approx. 0.2 mm play between shutter wheel and segment on slow speed mechanism. The right-hand end of the lever must be in central position between the lower and the upper shutter wheel.

On the side of the slow speed mechanism, the speed lever must not rest on the segment.



Operational test

With the shutter running at $^1/_{1000}$ sec. the gear train in the slow speed mechanism must not move. Hook the B-lever system 190.000–20.29 into B lever in the slow speed mechanism. Push the lever system underneath the ledge of the gear support (on shutter side) so that it will move easily. Loosen screw M 1.7 × 2 German Standard 0–84 (on shutter side), slip adjustment angle piece 190.000–20.26 underneath screw head and screw ist tightly. Readjust adjustment angle piece to give B-lever system minimum clearance, though the latter must work correctly. Set curve group to B position and check operation on B. If necessary, the B-lever system has to be readjusted. On release of the shutter the bent-down end of the wire must move approx. 2 mm deep towards the time lever. After release of the mechanism, the time lever has to be freed by the B-lever system.

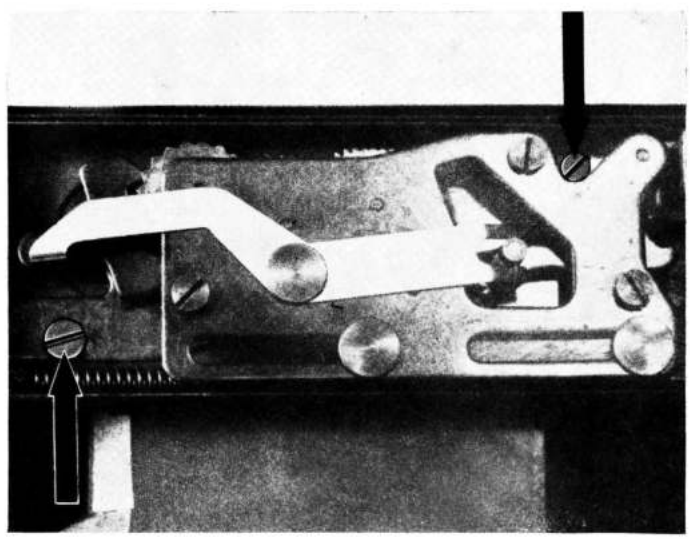
Set the speed curve on 1 sec., cock the shutter. Travel of shutter at 1 sec. must not be chocked by the end of the wire (on shutter side). Readjust, if necessary.

3.3.9. **Reassembling the delayed-action mechanism 190.000–21.00, the cable 190.000 150.00 as well as the light protection frame 190.000–20.24**

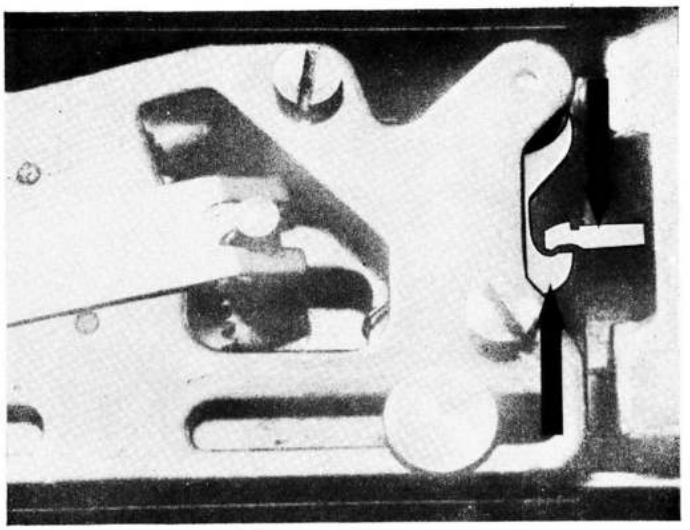
Check operation of delayed-action mechanism. Running time: 9 to 15 seconds. Engage guide slit of pull rod with notch of winding lever 190.000–135.00. Place dust cover plate 190.000 –20.23 on to underside of gear support. Insert delayed-action mechanism and fix it with 2 screws 900.0.07–0.04.

Make sure, when screwing on the delayed-action mechanism that it is on a parallel level with edge of gear support and that the dust cover plate does not impede operation of toothed rack of delayed-action mechanism.

With the shutter in released position: Wind up delayed-action mechanism with key A 1307 and check its operation. The protruding tensioning lever of the mirror winding mechanism (on shutter side) has to be adjusted so as to allow the control lever of the delayed-action mechanism, when the mechanism is set, to be pushed inwards, causing the mechanism to run down. Adjust, if necessary.



Wind up shutter and delayed-action mechanism. Delayed-action mechanism must not run down.
Otherwise, tensioning lever has to be pushed away from bedplate far enough to prevent delayed-action mechanism from running down. On release of the shutter, tensioning lever of bedplate must engage in control lever and, after a time lapse of 9 to 15 sec., release the cocking lever, whereupon mirror base and shutter are released.
In case of premature or retarded release of mirror base and shutter, depth of engagement of catch has to be adjusted on bedplate in the interior of the gear support. Apply lacquer to screw.
Solder end of jumper wire to contact piece of plate –22.00. Jumper wire has to run along edge of gear support to release lever without interfering with operation of gear support. Turn wire down at front edge of gear support.
Strain open ends of light protection frame 190.000–20.24 outwards and place frame into groove of field lens compartment in the gear support with the shutter being cocked. Frame must fit in well on all sides and the mirror base, when in its uppermost position, must not touch the frame.



3.4. **Final Assembly**

3.4.1. **Assembling gear support –20.00 and measuring cylinder –18.00 in the camera body –85.00**

Install measuring cylinder –18.00 in the camera body, apply adjusting disks. Check gear support for mechanical function once more, place cover plate 190.000–0.05 over delayed-action mechanism. Insert gear support in released condition into the camera body so far that it will rest on locking lever 190.000–160.16 of coupling. For convenient insertion of the gear support push forward lever –40.09. Insert measuring cylinder –18.00 into the bore of the plate, push backward locking lever of coupling as far as to be released from the gearing. Set the gear support on to its bearing points in the camera body. Locking lever of coupling must click into coupling –60.00. Lead jumper wire 190.000 –150.00 in between gear support and camera body to contact bush and screw cable shoe to contact bush.
Attention! When inserting the gear support, do not damage the teeth. Adjust gear support in the camera body by means of adjusting gauge A 1619, fasten it tightly to finder hood by 3 screws 1.7 × 5 German Standard 0–84 as well as on the gear side by 1 spacing bolt –0.10, subsequently, fasten it tightly on the side of the slow-speed mechanism by 1 screw 1.4 × 3 German Standard 0–84 and on the rear side by 1 screw 1.7 × 3 German Standard 0–84. Remove adjusting gauge.
Screw tightly the protecting sheet 0.14 by 2 screws AM 1.4 × 2 DKS 2001 tightly in the spool chamber on the side of the coupling.

3.4.2. **Assembling the release knob 190.000–6.00**

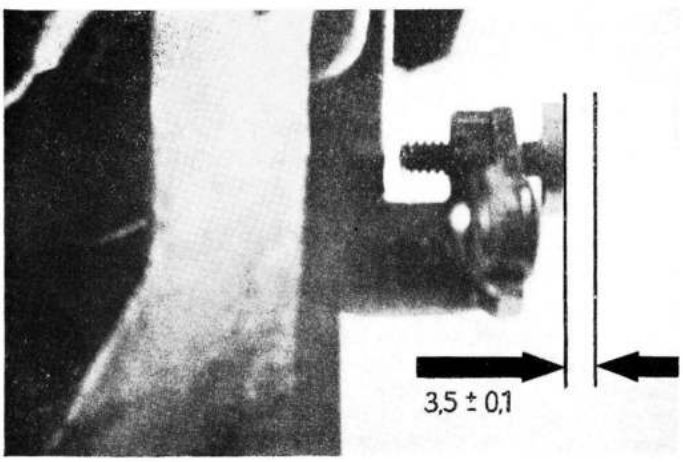
Add 2 washers 2 × 4 × 0.2 DKS 2001 to release bolt 190.000–0.37 and insert bolt into release knob. Place spring ring 190.000–0.27 on to locking ring, and screw release knob into camera.

Functioning test:

Cock the shutter. Release knob operates correctly if the shutter is released 1 to 2 mm before impact of the release mechanism. Otherwise the release knob has to be removed from the camera once more and adjusted with the aid of washers. Cock the shutter. On right-hand rotation of the locking ring the release action must run satisfactorily. In this top position, the locking ring has to be provided with a red mark.

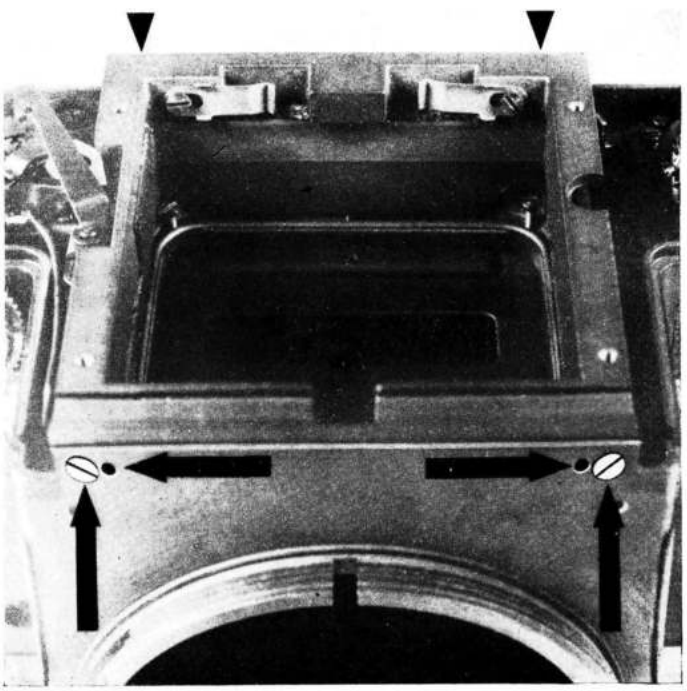
3.4.3. **Adjusting the stroke of the diaphragm plunger**

Set dial gauge to 0 position on lens seat. Shutter in released condition. Check minimum of 12 mm. Cock the shutter. Push winding lever up to its stop. Stroke must be within the minimum of 8.2 mm. When moving winding lever back to initial position, dial gauge must indicate 8.5 m ± 0.1 mm.
If stroke is either greater or smaller, winding lever of plate (on shutter plate) has to be readjusted.
To correct the above measurements readjustment can be made on the screw (190.000 –120.01) after loosening the slotted nut of diaphragm lever inside the gear support. Lock the nut and apply lacquer.



3.4.4. **Assembling the camera body inset 190.000–5.00 and checking the focusing device**

Glue chinchilla thread on to gear support on edge of field lens compartment. Fix insert 190.000–5.00 with 4 screws M 1.7 × 5 German Standard 5683. For rigidity of picture gate, screw 2 threaded pins 190.000–0.36 into front of camera body. For this purpose, place the assembled camera with the receiving point for the lens downwards, check the measure of 74.1 ± 0.04 mm of both the film runners by means of L 1145 u/1, and readjust them with the aid of both the threaded pins 190.000–0.36, if necessary.



3.4.5. **Adjusting the shutter speeds**

Set the shutter speeds on the MT 2 period meter. The values given in the table of shutter speeds in section 3.4.13 as well as the diagram to the right are competent for the adjustment of the shutter speeds. The short speeds of $^1/_{1000}$ sec., $^1/_{500}$ sec,. $^1/_{250}$ sec., and $^1/_{125}$ sec. are measured at the beginning, in the middle, and at the end of the picture gate.

All the other shutter speeds are measured in the middle of the picture gate.

Checking $^1/_{1000}$ sec. Should there be too great a degree of irregularity, curtain tension has to be adjusted accordingly.

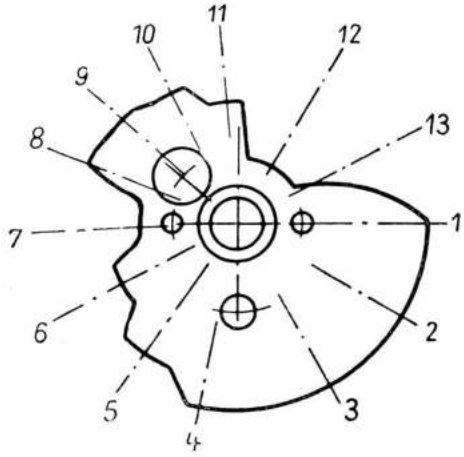
Adjustment of $^1/_{500}$ sec. is made by tensioning, or relieving tension of spring of short speed lever with tightening by A 1271.

Adjustment of $^1/_{250}$ sec. is performed by moving the little adjustment support with screw on upper side of speed curve. Shutter must be in released condition.

Adjustment of $^1/_{125}$ sec. is carried through by movement of the adjusting screw in bearing bolt of short speed lever. Should there be excessive tension on spring of short speed lever, or too great a degree of irregularity, the adjustment plate on the short speed lever must, if necessary, be forced into engagement.

This alters the tension of the short time lever and also the degree of irregularity.

Adjustment of the short speeds is followed by the 1 second test. If necessary, adjust segment spring with tightening key A 1271. After the 1 second adjustment, $^1/_{60}$ sec. is adjusted by changing the slow speed lever; whereupon all the other speeds, $^1/_{30}$ – $\not{s}$ – $^1/_{15}$ – $^1/_8$ – $^1/_4$ and $^1/_2$ sec., have to be checked. If necessary, the position of the slow speed lever has to be corrected once more, or the tension of the segment altered. When adjusting the shutter speeds make sure that they approach the nominal values as much as possible. All adjustet screws on the slow speed mechanism must be secured with lacquer.



1 = 1/1000
2 = 1/500
3 = 1/250
4 = 1/125
5 = 1/60
6 = 1/30
7 = ½
8 = 1/15
9 = 1/8
10 = 1/4
11 = 1/2
12 = 1
13 = B

3.4.6. **Assembling the spool support –12.00, base plate –11.00, and the camera back 100.00**

Screw spool support –12.00 to bottom of camera body, with guide pins pointing towards spool chamber, with 2 screws 190.000–40.08. Insert film spool and adjust spool support to bring spool in parallel position with runner ribs and into a right angle to the picture gate. Attach base plate –11.00 to camera body and fasten it with 2 screws M 1.7 × 3 German Standard 0–84.

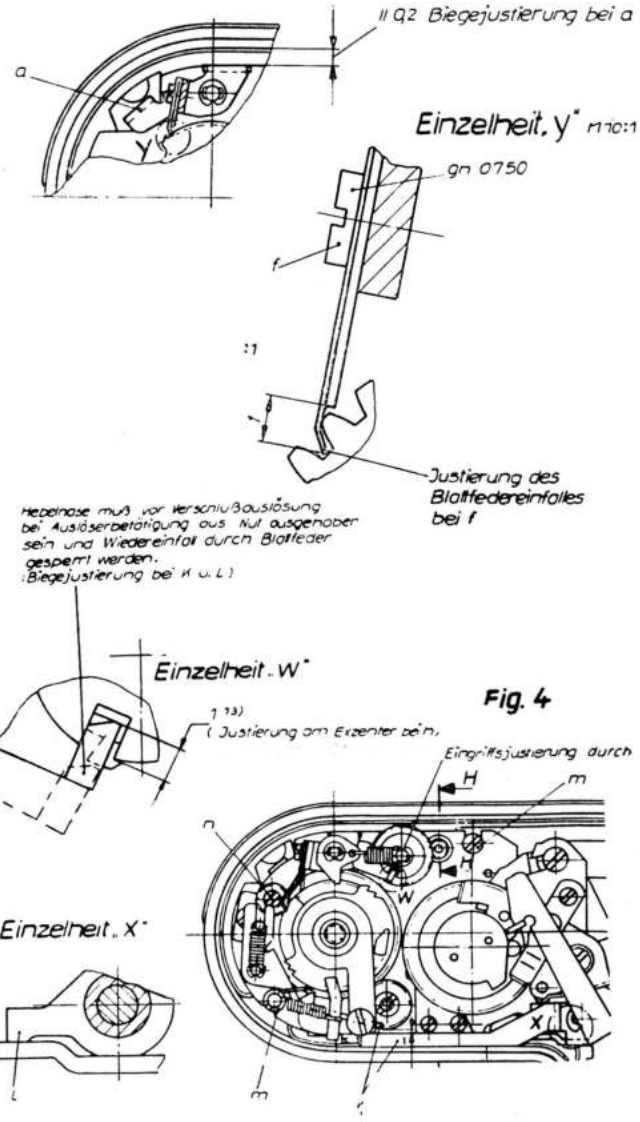
Fix hinge plate –90.00 into right-hand spool chamber with 2 screws 190.000–160.15.

Fit camera back –100.00 with its joint roller into hinge plate and push in spindle 190.000 –0.01. Adjust camera back for unobjectionable locking of the locking means.

3.4.7. **Adjusting the film feed**

Check mesh between measuring cylinder and film-feed wheel –56.00, and adjust it, if necessary, by turning the film-feed shaft (eccentric). Hook torsion spring –45.02 in spacing bolt –0.10 and spur wheel –48.00.

Shut rear wall, adjust mesh of spring –40.08 with spur wheel –48.00 (cp. drawing). Tighten the screw and apply lacquer. On rotating the measuring cylinder, lever –54.00 must unobjectionably join the slot of the film-feed wheel –56.00, and the pinion must engage the spur wheel –48.00. If necessary, adjust at the pivot pin of the pinion (eccentric) at "n".



Adjustment by bending at a

Detail "y" scale 10:1

Adjustment of leaf-spring engagement at f
Before shutter is released, lever projection must be lifted out of groove when release is operated. Reengagement must be blocked by leaf spring.
(Adjustment by bending at K and L)

Detail "W"

Adjustment at the eccentric at n

Detail "X"

Adjustment of mesh by H and m

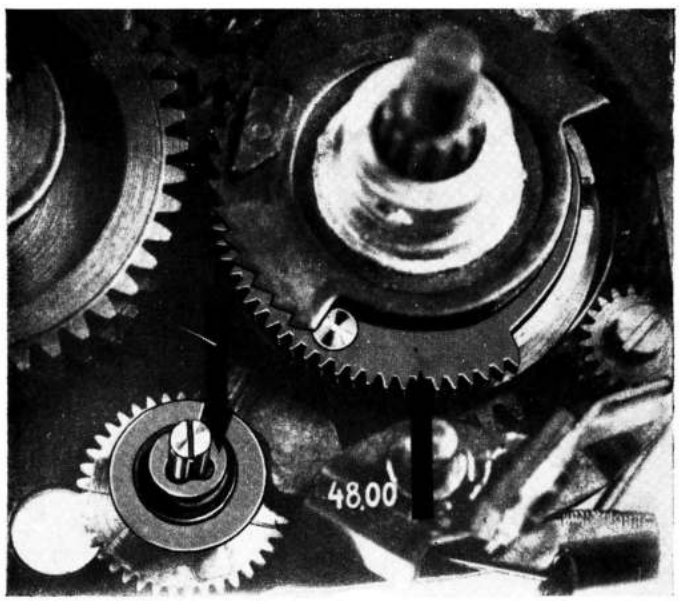
Fig. 4

Cocking the shutter

On cocking, the spur wheel –48.00 is taken along by the pinion and fixed in its final position by the spring –40.08. The wheel disk –46.00 of the film-feed wheel should return to its initial position as soon as cocking is terminated, whereas the spur wheel –48.00 is switched with each cocking process until the spring –40.08 has reached the recess. Only when the rear wall is opened, the spur wheel returns to its initial position at the angle.

Releasing the camera

When operating the release knob, lever –54.00 has to be lifted out of the groove of the film-feed wheel via lever –52.00, and re-engagement has to be prevented by the spring –58.03. Only then, the shutter can be released.

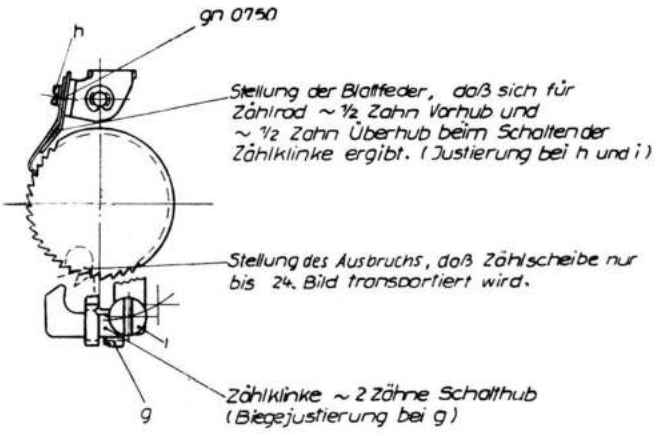


3.4.8. **Assembling the counting lever –15.00, and adjusting counting operation**

Assemble adjusting disk, counting lever, disk –0.12, and spring ring –0.13 in the mentioned order, hook in tension spring 0.11.

Adjusting counting operation

Open camera rear wall, put on counting wheel –3.00. Shut rear wall of camera and adjust stroke of counting lever at the proper points. Tighten by screwing spring –40.05, apply lacquer. Adjust counting lever in its final position (24th picture) by loosening both the screws of the counting wheel and re-setting the counting dial. Retighten the screws, apply lacquer.


gn 0750
h
Stellung der Blattfeder, daß sich für Zählrad ~ ½ Zahn Vorhub und ~ ½ Zahn Überhub beim Schalten der Zählklinke ergibt. (Justierung bei h und i)
Stellung des Ausbruchs, daß Zählscheibe nur bis 24. Bild transportiert wird.
Zählklinke ~ 2 Zähne Schalthub (Biegejustierung bei g)
g

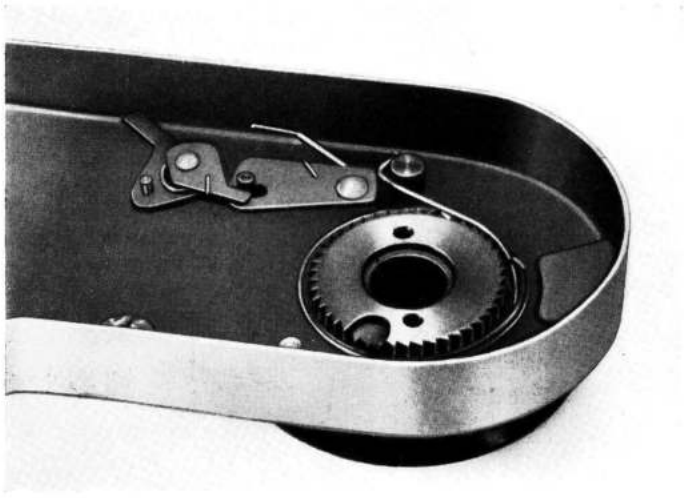
3.4.9. **Assembling the camera top –5.00 with counting device –3.00 and winding lever –1.00**

Insert counting wheel –3.00 into camera top –5.00, hook spring –3.02 in pivot fixed in the camera top, pre-tension counting wheel by 180°. Attach camera top with counting wheel to camera, turning the blocking disk to the right. With this, the camera should be released, the rear wall opened. Tighten camera top at the side of counting wheel by screw –0.07, turning the ring –8.00 slightly forward; in its 0-position the counting wheel must be adjacent to the screw –0.07.

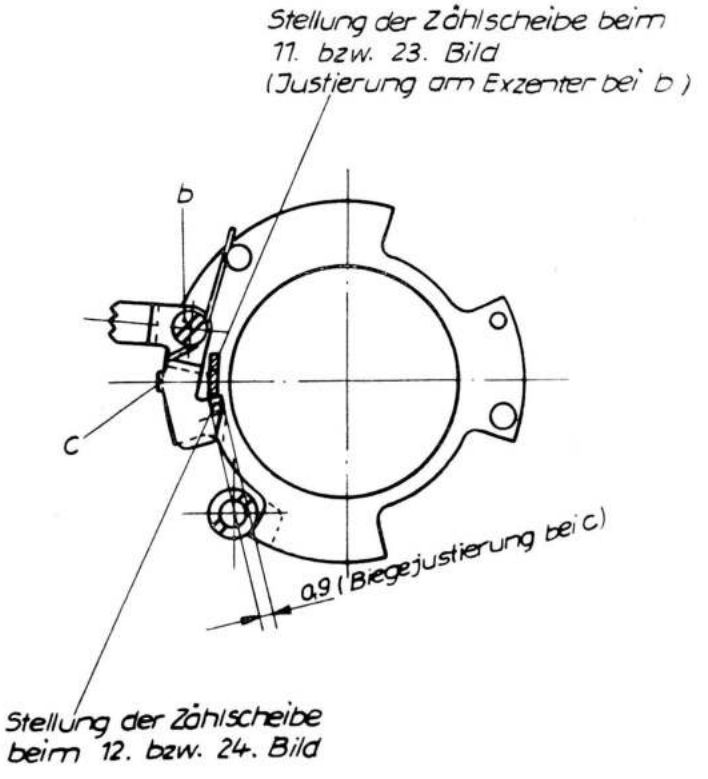
Attach winding lever, put on ring –0.06 and tighten it by screwing it with sleeve –0.05.

When tensioning the camera, the winding lever must freely pass the blocking disk. When the camera has been tensioned, the blocking disk must be lifted off from the winding lever and return into the blocking position. Repeated winding should not be possible. After picture – 12 – has been reached, the ring –8.00 has to be taken along and block the winding lever for any further winding operation. Only after the lever –8.03 has been pushed back, the blocking disk should release again the winding lever. The same process is repeated as soon as picture – 24 – has been reached.

If necessary, reposition the lever by adjusting it at the eccentric rivet (at b).



Adjust leaf spring so that an advance of ~ ½ a tooth is applied to counting wheel and an excess advance of ~ ½ a tooth is effected when counting pawl is operated (adjustment at h and i)
Adjust recess so that counting wheel is transported only up to the 24th picture
Counting pawl has an advance of ~ 2 teeth (Bending adjustment at g)
Position of the counting dial at the 11th or 23th picture
(Adjustment at the eccentric at b)
(Bending adjustment at c)
Position of the counting dial at the 12th or 24th picture


Stellung der Zählscheibe beim 11. bzw. 23. Bild (Justierung am Exzenter bei b)
b
c
0,9 (Biegejustierung bei c)
Stellung der Zählscheibe beim 12. bzw. 24. Bild

3.4.10. **Checking film feed and counting operation**

Load the camera with a test film, set shutter speed setting dial to "B" (roll film 120 or 220), release the shutter and maintain it open, mark through the lens aperture with a lead pencil the right and left sides of the image field on the film.

The first three feeds are idle feeds. By the forth feed the point between "0" and "2" (the first image) should be in the center of the gate. After image 12, winding lever has to be blocked, and only after having released the feed lever arranged on the right-hand side below the winding lever, the latter should be released again. When, however, a 220 test film is used, after releasing the feed lever, winding can be done to the 24th image, and then the lever is released.

Then spool up the film completely, remove it from the camera. When opening the rear wall, the counting dial must spring back to its initial position.

Unspool the test film and check it. The film should show satisfactorily 12 or 24 images (depending on the kind of film), and safety streaks at the beginning and the end of the film.

3.4.11. **Assembling the speed setting dial –5.01, the front panel –0.03 and the bayonet ring 190.000–0.10**

Tighten by 4 screws 190.000–0.08 and disk 190.000–0.51 the camera top in the bores of the finder hood and, at the side of the time setting dial by 1 screw M 1.7 × 3 German Standard 0–84.

Before reassembling the speed setting dial –5.01, check whether the ball in pilot disk and the spring 190.000–3.20 are situated above it. Put on the speed setting dial –5.01, and thereupon disk 2 × 10 × 0.2 DKS 2001 and disk 5 × 10 × 1 DKS 2001. Put on setting ring 158.009–0.03, insert corrugated spring plate 158.009–0.02, secure it by screwing with bushing –0.05, apply lacquer, paste on reminder dial 150.009–0.01. Loosen again bushing –0.05 on the side of the winding lever, assemble setting ring 158.009–0.03 and corrugated spring plate 158.000–0.02 and tighten them by screwing with bushing –0.05, apply lacquer, and paste on film reminder dial –0.04.

Secure front panel –0.03 with 3 screws 900.008 –0.03. Screw on bayonet ring 190.000–0.10, screw in screw 183.000–10.18.

3.4.12. **Assembling the mirror 190.000–0.26, Optical Adjustment of the camera, and assembling the image field lens**

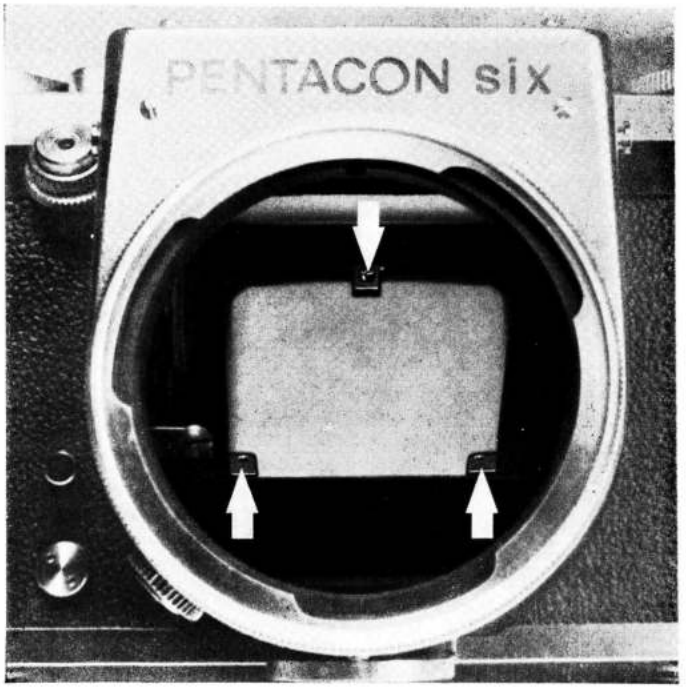
Cock the shutter. Place mirror on to mirror base and, with fastening 1 spring 190.000–0.23 at the top and fastening springs 190.000–0.24 and 190.000–0.25 at the bottom, screw mirror base on with 1 cap screw each BM 1.4 × 2 German Standard 2010.

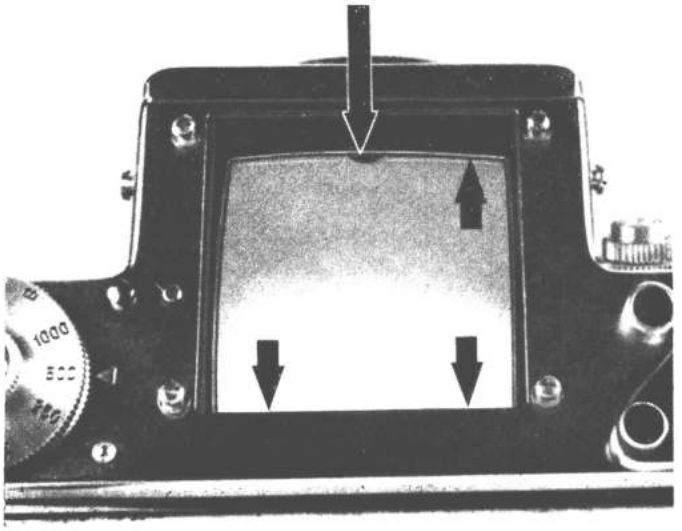
Attention! Do not touch the surface of the mirror.

Optical adjustment of camera and installment of image field lens

Set up camera with lens in front of collimator. Place image field lens, thin edge towards back of camera, on to adjusting screw. Test image must appear perfectly sharp over the entire surface of the field lens. If necessary, height of adjusting screws should be corrected.

Apply lacquer to adjusting screws. Install field lens. Insert wire frame 190.000–0.14, with opening towards the front, into field lens compartment, and press it against the field lens. Screw 2 catches 190.000–5.01 with cap screws M 1.7 × 3 German Standard 0–84 each and 1 catch 190.000–0.13 with cap screw M 1.7 × 3 German Standard 0–84 at the front. The catches should press against the wire frame and should be screwed on tightly.





3.4.13. **Measurement and evaluation of shutter speeds**
Preparation for the test

The camera must be placed against the lighting device and adjusted as follows:

1. The light aperture of the lighting equipment has to be projected sharply in the curtain level of the camera.
2. The light aperture in its beginning and end positions must have a symmetrical distance of approximately 1.2 mm from the edges of the picture gate.

If the MT 2 Period Meter has been gauged according to the "Rules for gauging the MT 2 Period Meter in conjunction with the appurtenent Lighting Device", the shutter speeds of the camera have to show the following values:

Nominal speed sec.	Computed value ms	Tolerance %	Tolerance in ms limits
1	1000	± 25	750–1250
1/2	500	± 25	375–625
1/4	250	± 25	187–312
1/8	125	± 25	94–156
1/15	62.5	± 25	47–78
≲	45	± 15	38–52
1/30	31.2	± 25	23–39
1/60	15.6	± 25	11.7–19.5
1/125	7.8	± 25	5.8–9.8
1/250	3.9	± 35	2.6–5.3
1/500	1.95	± 35	1.3–2.6
1/1000	0.975	± 35	0.65–1.3

4. List of the assembling tools required for 139.008

139.008–20.00 M 1 and /1–/4	assembling device for support 20.00 where
139.008–20.00/3	has to be used for Pentacon six
139.008–20.00/4	has to be used for Praktisix 190.000 and 129.008
139.008–5.00 M 1	Slit nut – spanner
139.008–0 M 1	Assembling spanner for spool support
139.008–40.00 B 2/1	Adjustment bushing

Tools used also for Praktisix 190.000

A 331	Special spanner
A 1307	Key for delayed-action mechanism (for 20.00)
A 1691	Drill jig bush for 1/1000
A 1398	Socket wrench with bar for screw slot
A 1619	Adjusting gauge for support box GM
A 1535	Spanner
A 1278	Special key
A 1271	Tightening key
L 1145 and /1	Gauge for checking focal measurement
L 1552 and /1	Adjusting gauge for mirror base

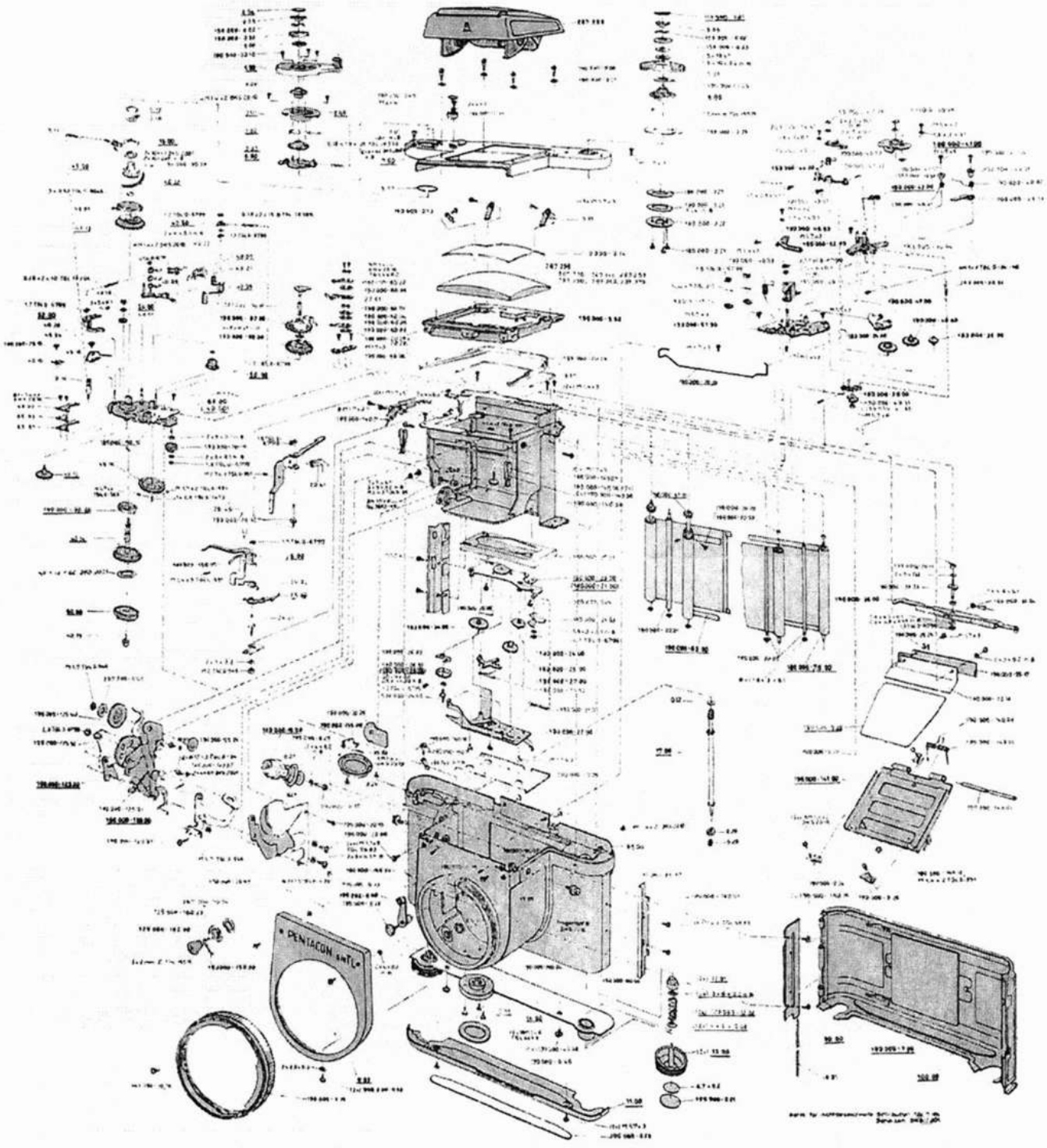
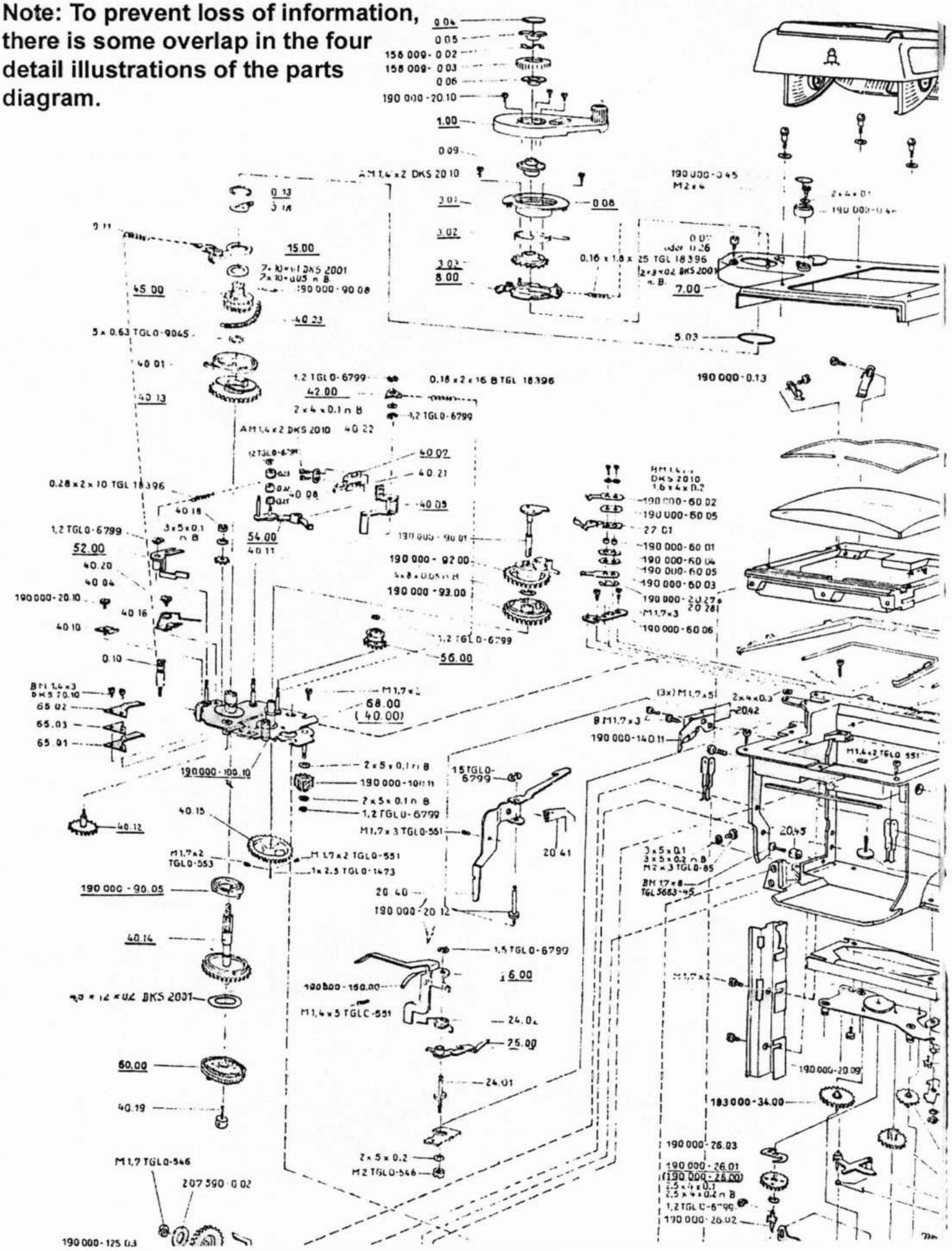


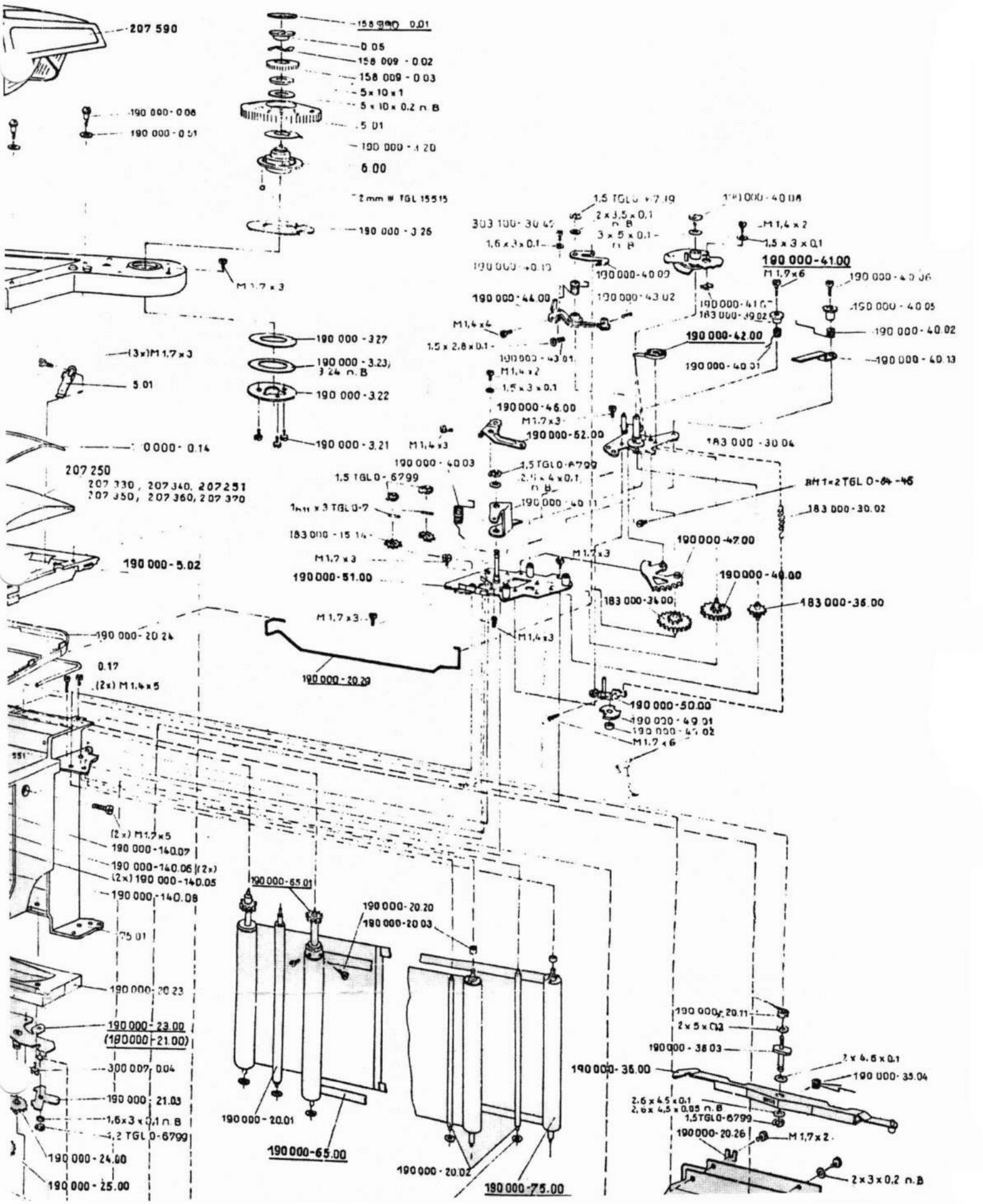
Illustration 1 Parts/assembly Diagram
See following 4 illlustrations for detail drawings.

Area Covered: Upper Left

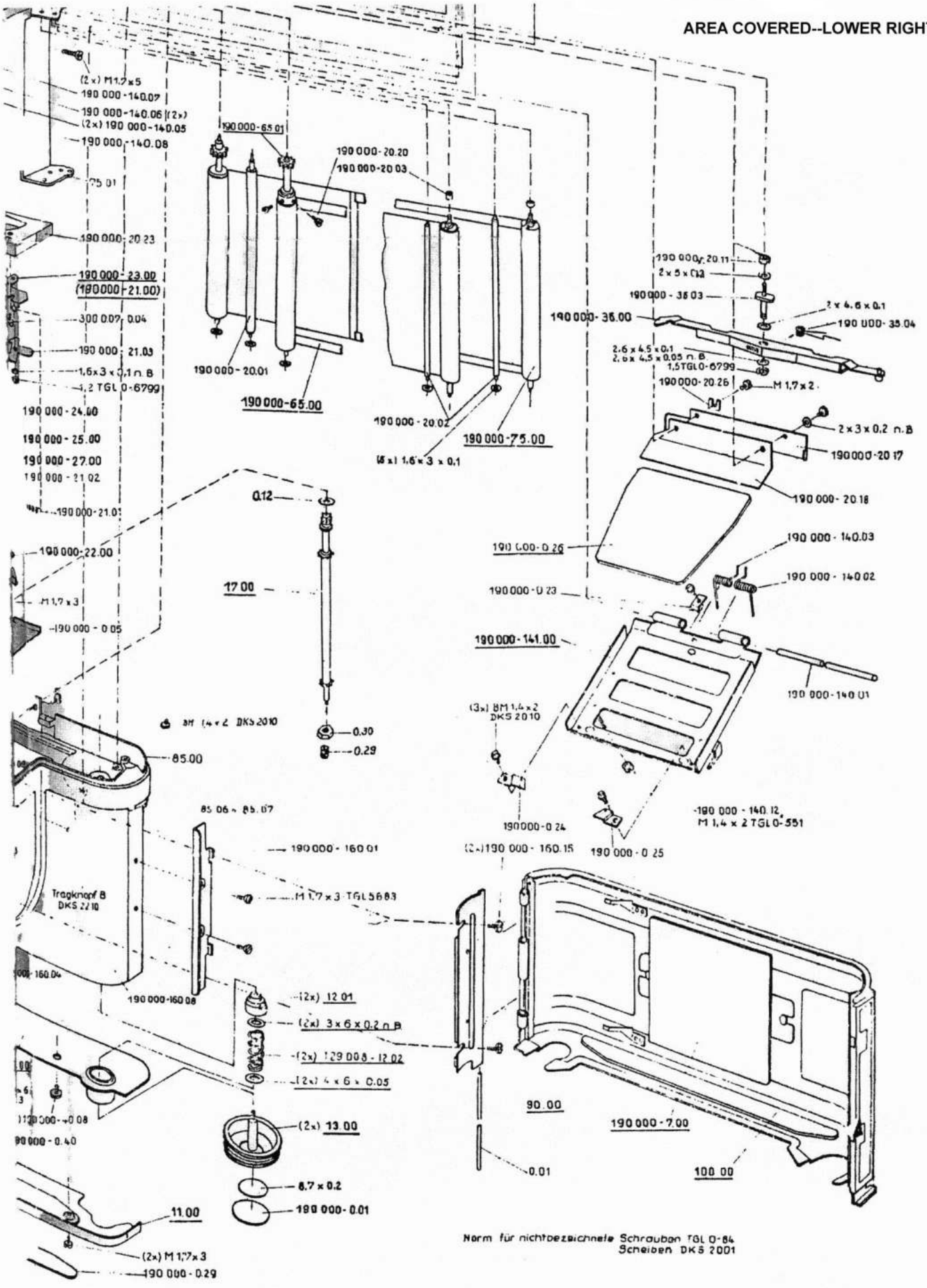
Note: To prevent loss of information, there is some overlap in the four detail illustrations of the parts diagram.

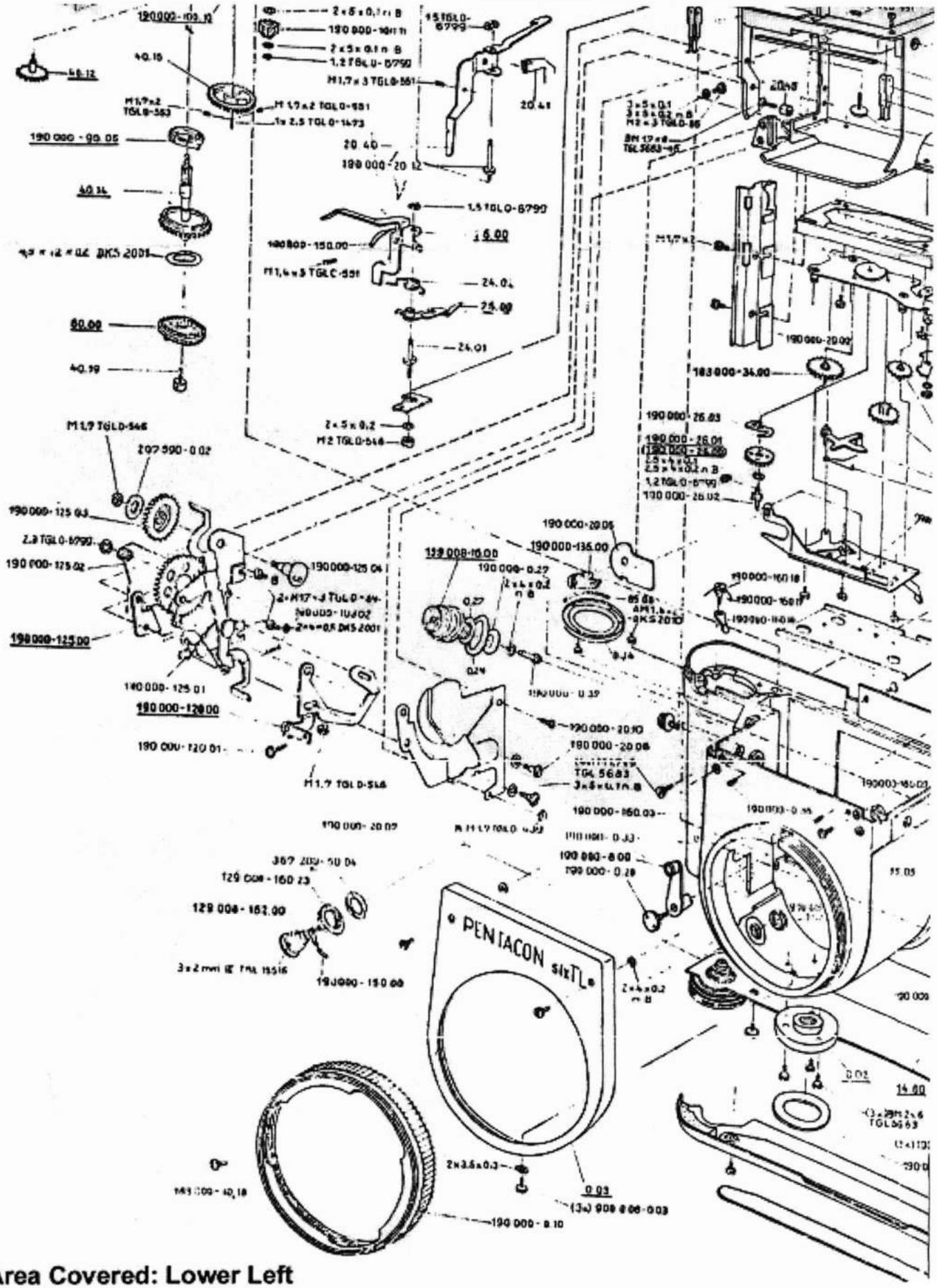


Area Covered: Upper Right



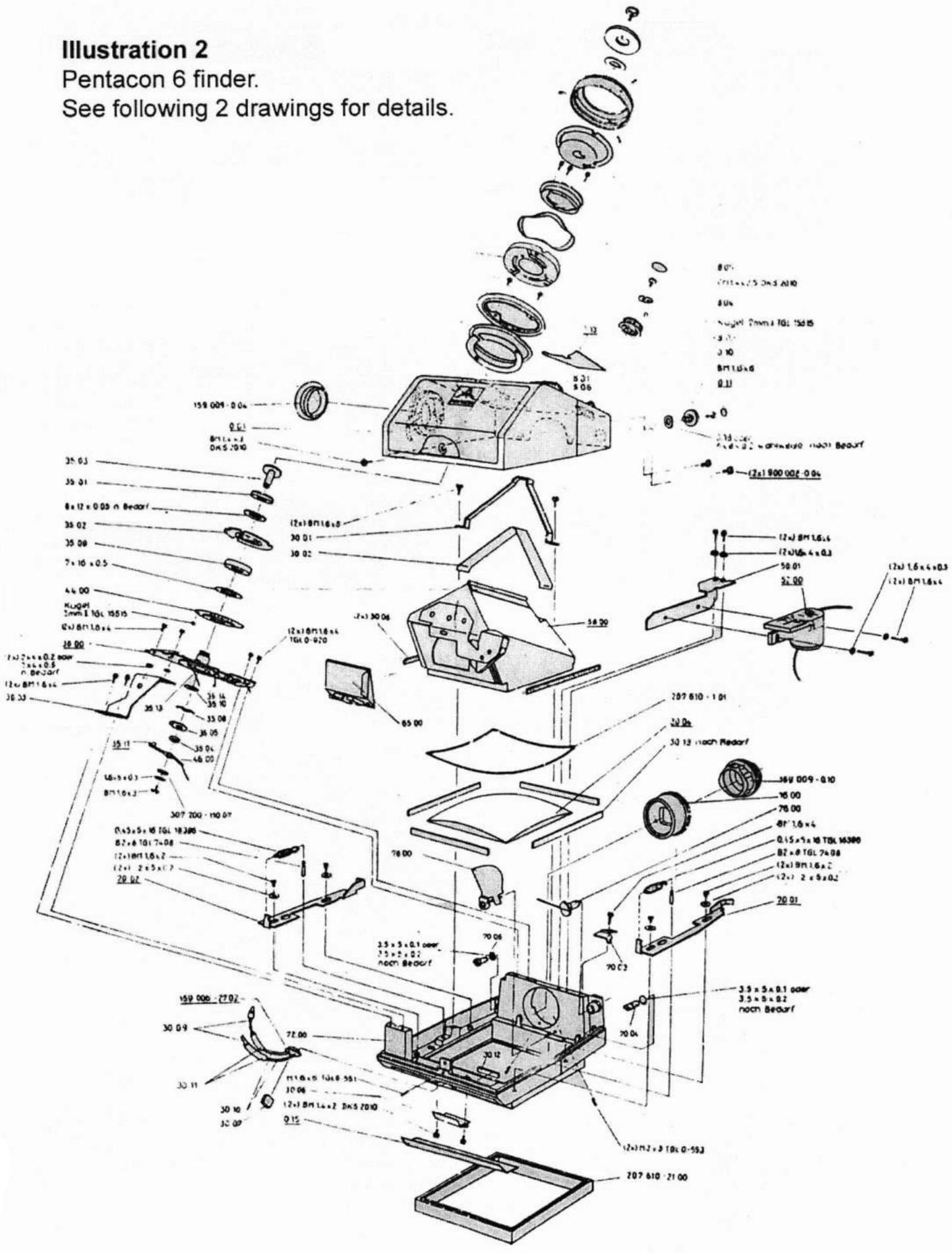
AREA COVERED--LOWER RIGHT

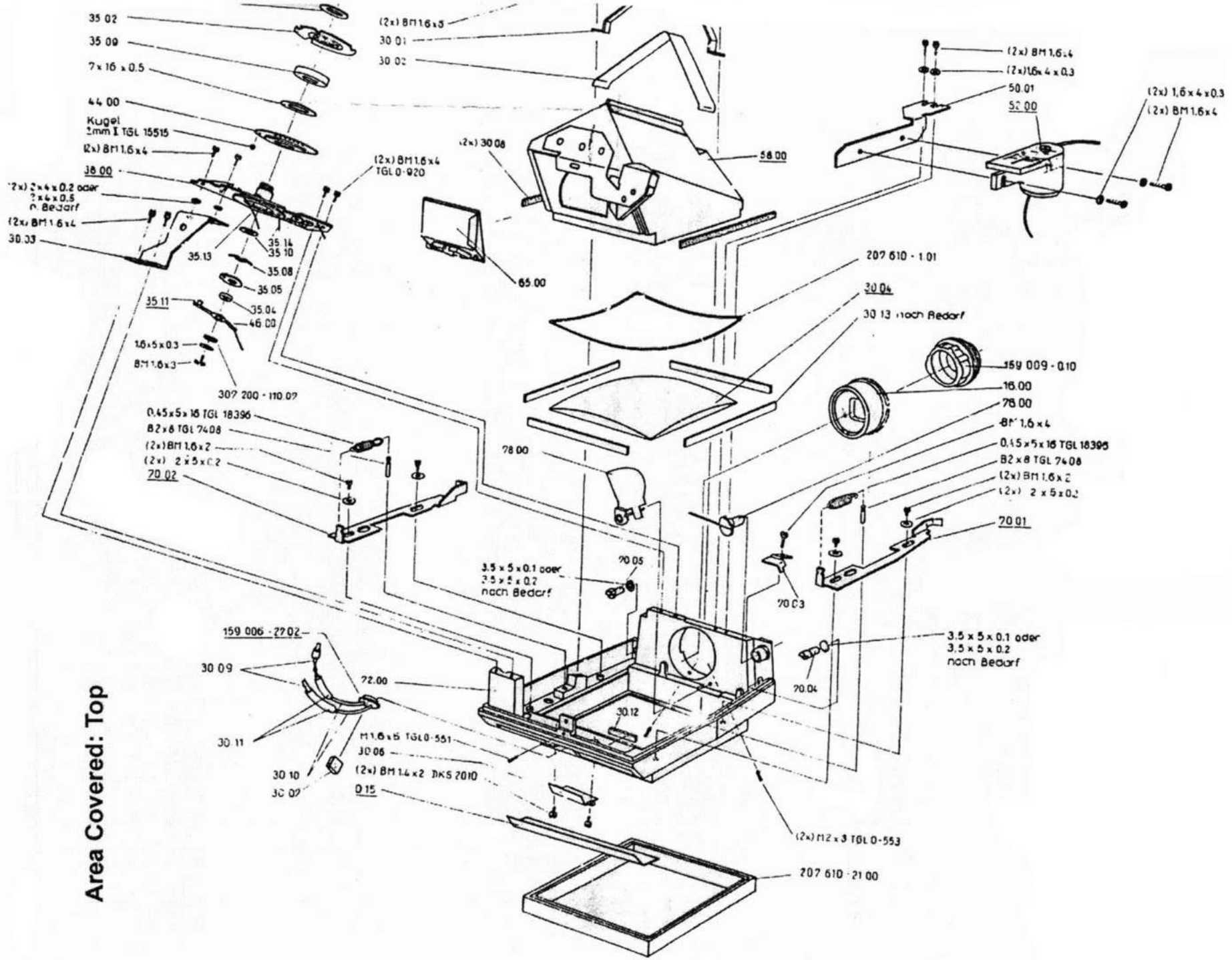


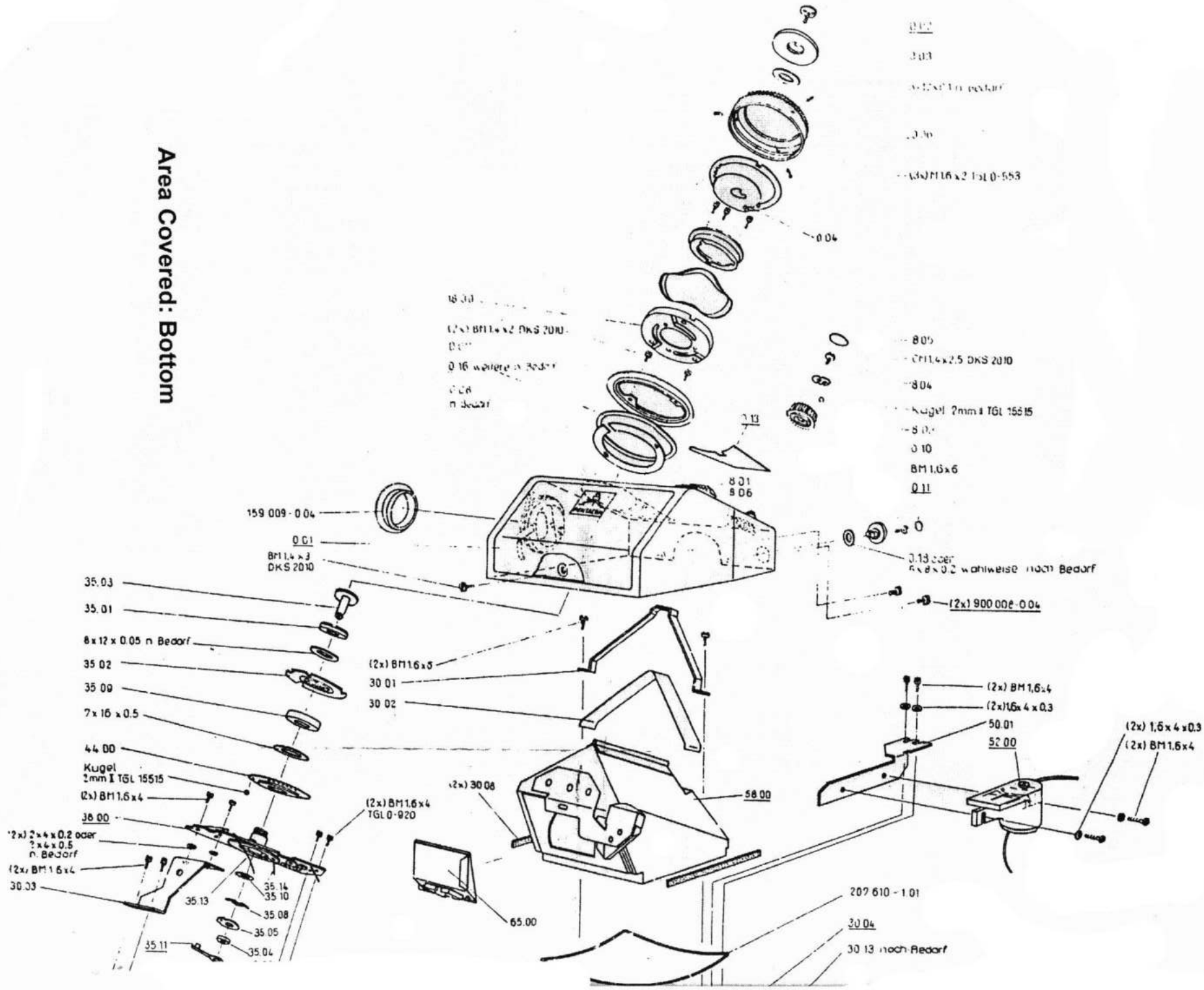


Area Covered: Lower Left

Illustration 2
Pentacon 6 finder.
See following 2 drawings for details.




Area Covered: Top
35 02
35 09
7 x 16 x 0.5
44 00
Kugel
2mm Ø TGL 15515
(2x) BM 1.6 x 4
38 00
(2x) 2 x 4 x 0.2 oder
2 x 4 x 0.5
n. Bedarf
(2x) BM 1.6 x 4
30 03
35 13
35 14
35 10
35 08
35 05
35 11
35 04
46 00
1.6 x 5 x 0.3
BM 1.6 x 3
307 200 - 110.07
0.45 x 5 x 16 TGL 18396
B2 x 8 TGL 7408
(2x) BM 1.6 x 2
(2x) 2 x 5 x 0.2
70 02
(2x) BM 1.6 x 5
30 01
30 02
(2x) 30 08
58 00
(2x) BM 1.6 x 4
TGL 0-920
65 00
78 00
207 610 - 1.01
30 04
30 13 nach Bedarf
159 009 - 0.10
16.00
78.00
BM 1.6 x 4
0.45 x 5 x 16 TGL 18396
B2 x 8 TGL 7408
(2x) BM 1.6 x 2
(2x) 2 x 5 x 0.2
70 01
70 05
3.5 x 5 x 0.1 oder
3.5 x 5 x 0.2
nach Bedarf
70 03
3.5 x 5 x 0.1 oder
3.5 x 5 x 0.2
nach Bedarf
70 04
159 006 - 27.02
30 09
72.00
30 12
30 11
M1.6 x 5 TGL 0-551
30 06
30 10
(2x) BM 1.4 x 2 DKS 2010
30 07
0 15
(2x) M2 x 3 TGL 0-553
207 610 - 21 00
50.01
50 00
(2x) 1.6 x 4 x 0.3
(2x) BM 1.6 x 4


Area Covered: Bottom
0 04
8 05
BM 1,6x6
0 11
8 01
8 06
159 009 - 0 04
0 01
BM 1,4 x 3
DKS 2010
35.03
35.01
8 x 12 x 0.05 n Bedarf
35 02
35 09
7 x 16 x 0.5
44 00
Kugel
2mm I TGL 15515
(2x) BM 1,6x4
36 00
(2x) 2 x 4 x 0.2 oder
2 x 4 x 0.5
n. Bedarf
(2x) BM 1,6x4
30.03
35.13
35.14
35.10
35.08
35.05
35.11
35.04
(2x) BM1,6x5
30 01
30 02
(2x) 30 08
(2x) BM1,6x4
TGL 0-920
58 00
65.00
207 610 - 1 01
30 04
30 13 nach Bedarf
(2x) BM 1,6x4
(2x) 1,6 x 4 x 0.3
50.01
52 00
(2x) 1,6 x 4 x 0.3
(2x) BM 1,6x4
(2x) 900 006 - 0 04